The Foreword to the COSATI Progress Report for 1966 describes the climate surround-
ing the STI community and its progress. Aines wrote of the period: [1]

> In accomplishing the research needed for the preparation of the 1966
> version of COSATI's progress report, it became quite evident, as it
> has previously, that the general improvement of science communications
> is a highly complex business and that, despite the umparalleled power
> of the new communication technology, accrual of even moderate gains
> takes much hard work, and comes in small fractions. Yet, despite this
> sobering finding, it is also evident that the contributions made by
> the Federal agencies toward the improvement of scientific and technical
> information exchange are as substantial as the flow of information it-
> self.

There was increasing understanding within the Federal agencies that they were expand-
ing their investments of talents and resources to improve their technical information
programs. There was no doubt about their rapidity of growth as large information-gen-
erating, information-accessing, information-handling, and information-disseminating
establishments, among the biggest in the world. Through their instrument COSATI, the
agencies provided "equally scarce talent and resources to contribute to the solut ion
of growing information exchange problems within and outise of the confines of govern-
ment." The Foreword provides a retrospective appraisal of COSATI's role and accom-
plishments. In the four years of its existence, COSATI has proven to be a unique in-
st rument, largely because of the close to two hundred people provided by the agencies
who man its panels and task groups and who are dedicated to making it a success. As
a forum and as an information exchange and joint information action center, it plays
an unparalleled role in the government. One secret of its success is revealed in the
following statement:

> The close attention and warm support COSATI receives from the Chairman
> of the Federal Council for Science and Technology, Dr. Donald F. Hornig,
> Dr. Charles Kidd, and the members of the Federal Council for Science
> and Technology, provide the favorable environment that contributes to
> the solvency of COSATI.

The size of the COSATI apparatus is surprising to the information managers of today,
but the Hornigs, Kidds and Humphreys of the 1960s were determined that the effect-
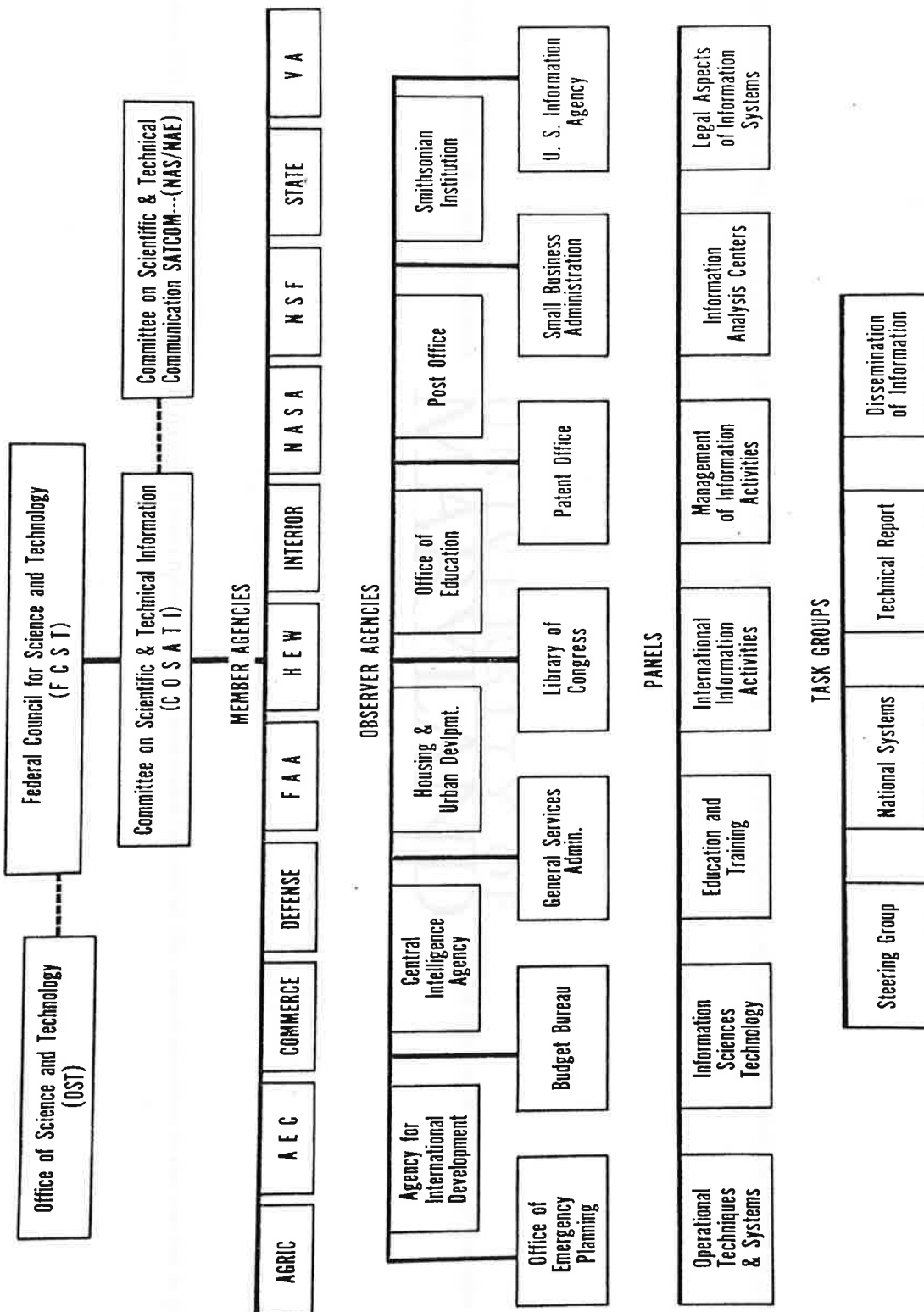
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[1] Progress of the United States Government in Scientific and Technical Communication:
1966. Committee on Scientific and Technical Information, Federal Council for
Science and Technology, Executive Office of the President, Washington, D.C., Febru-
ary 1967, pp 35.

iveness of science and technology would not be undercut by a second-class STI system. Their resolve was transmitted to the heads of Federal agencies and the science communication workers in the private sector, which at that time was largely controlled by the professional societies. The number of panels and task groups in operation was an index of the continuing interest of the combined R&D and STI communities. The organization is shown in the table ( ) on the next page. The philosophy that COSATI had at that time was reflected in the diversity of areas that needed attention on a short-term or a long-term basis. The panels were the long range, continuing efforts; the task groups were considered ad hoc and time-limited. Both came into being ,only after considerable thought was given to their need. There had to be an advance determination that the particular effort wanted was not being undertaken elsewhere. Another rule was that the function of the panel or task group had to be valuable to the entire group, rather than/one only or two agencies. Also worth noting was the number of agencies that were members, 11 of them. Additionally, there were 13 observer agencies. There was a sound reason for the involvement of 24 agencies and other groups from the Executive and the Legislative branches.

During the 1960s, the United States was making a massive response to the Soviet's space success with its Sputnik adventure. The growing recognition that the American monopoly of advanced technology was being challenged resulted in an extraordinary burst of energy. During this period, the computer and other advanced information technology began to be recognized as an unsurpassed tool that could contribute in all fields of science, technology, education, governance and commerce. Perhaps no where else in the U.S. Government, and possibly the world, was there such a concentrated focus on the information process as in COSATI. While the computer and other information technology such as micrographics and microphotography,received considerable attention in COSATI, its basic concern was in the gathering, the handling, the dissemination, and the utilization of technical knowledge. Its leadership saw technical information as a basic ingredient in the generation and re-generation of knowledge. It saw in its quest to perfect the Federal STI process and infrastructure an opportunity to further the

COSATI ORGANIZATION

Office of Science and Technology (OST)

Federal Council for Science and Technology (F C S T)

Committee on Scientific & Technical Information (C O S A T I)

Committee on Scientific & Technical Communication SATCOM---(NAS/NAE)

MEMBER AGENCIES

AGRIC | A E C | COMMERCE | DEFENSE | F A A | H E W | INTERIOR | N A S A | N S F | STATE | V A

OBSERVER AGENCIES

Office of Emergency Planning

Agency for International Development

Central Intelligence Agency

Housing & Urban Devlpmt.

Office of Education

Post Office

Smithsonian Institution

Budget Bureau

General Services Admin.

Library of Congress

Patent Office

Small Business Administration

U. S. Information Agency

PANELS

Operational Techniques & Systems

Information Sciences Technology

Education and Training

International Information Activities

Management of Information Activities

Information Analysis Centers

Legal Aspects of Information Systems

TASK GROUPS

Steering Group

National Systems

Technical Report

Dissemination of Information

progress of Federal science and technology and all of the other intellectual processes of the nation that were based on the expert use of new and proven knowledge. It recognized that COSATI was acting as a trail-blazer for all interested Federal government bodies that sensed that even non-R&D programs could profit by upgrading their information and communication processes. It was therefore the policy of COSATI to accept the requests of agencies to become observers, even if they were not involved in R&D as were the members of the Federal Council for Science and Technology. The fact of the matter is that all organizations must be involved in research and development in order to achieve their missions in a changing society. This was true then and it is true now, but apparently the environment for progress was more favorable during the 1960s than today. For example, the Registrar of Copyrights, Library of Congress, and the Director of the Patent Office maintained observers in the COSATI function. It was fully undertood in the 1960s that patents and copyrights were processes that were important in science communications. The Office of Emergency Planning was required to have a sensitive and effective information and communication system to be successful. The U.S. Information Agency, as its name implied, was deeply involved in the delivery and application of all kinds of information, including information about U.S. science and technology, in its international programs. While COSATI was concerned primarily with unclassified STI, CIA was always interested in the improvement of the information process that was a key goal of COSATI. The Bureau of the Budget played a vital role in COSATI activities for several reasons: it gave BOB a clearer picture of what was happening in the Federal and national science communications area; it heard the expressions from the COSATI community about needs and opportunities that were useful to the BOB examiners who dealt with individual agency budgets; and it kept BOB apprised of the major thrusts of the information revolution. In spite of its weaknesses in exercising power over the Federal agencies, the lack of directive power, COSATI was regarded as one of the stronger committees in FCST with its ability to get things done by achieving consensus and agreement for specific actions. It will never be possible to determine what involvement with COSATI did for the observer agencies in developing their own information processes,

                        to believe
but it is reasonable/that they derived benefits from the   interaction in their

internal programs. Little has been said or written about in the intervening years

about the participation of the observer agencies in the affairs of COSATI. Hopefully,

this will set the record straight.

What makes an organization successful is not always easy to define.Perhaps one char-

acteristic is a group's ability to comprehend - if not measure - its role and influ-

ence even while it is engaged in discharging its responsibilities. The 1966 COSATI

Progress Report provides a rare, introspective assessment along these lines worth

repeating: [1]

> COSA T I appears to assume a number of different identities to various
> groups and people in and out of the Government. For some, it offers clear
> testimony that senior officials in the Executive Offices of the President
> are much concerned with the development of a program of information-handl-
> ing employing the most modern methods of communication. To others, it is
> proof that Federal agency heads recognize the need for continuing action
> to improve interchange of information and that they are willing to develop
> appropriate interacency programs. To many, COSATI is identified as a
> means to improve, bring order to, and integrate the complex imformation
> systems of the Federal agencies, and to contribute to the improved coordin-
> ation of Government R&D programs. Others see COSATI as a major contributor
> in the development of national and international scientific and technical
> information systems. There are a number of other identities attributed to
> COSATI, but only one more will be mentioned, COSATI, and of course, OST,
> through their leadership and initiative, are stimulating organizations in
> out of the government, in the United States and overseas, in science and
> technology and in other fields, to seek new methods of improving their
> own capability to communicate efficiently and effectively both internally
> and in the wider community.

The Report lists as the major thrust of COSATI its ability to create a sense of aware-

ness of its function as seen in the volume of citations about its intent and pro-

gram in the scientific and technical press. Interestingly, the awareness is visible

throughout the world. Another way to measure the awareness of the COSATI program and

its stimulative effect is reflected in the number of new proposals and revised inform-

ation systems and programs in professional societies, industrial groups, and other

governmental and private organizations. Examples are cited: the Interuniversity

[1] Ibid, p. 1

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Communications Council (EDUCOM), the American Chemical Society (ACS, Engineers Joint

Council (EJC), the American Institute of Physics (AIP) and others. Another important

sign is seen in the sustained interest of COSATI and its supporters in the Federal

agencies and in the Executive Office of the President in improving internal programs

including funding for COSATI and internal agency STI programs.

The Report describes the broadening participation in the COSATI program by agencies

and then points out: [1]

> Because of the unique position COSATI occupies and its impact on the total
> information community, there have been a number of requests from nongovern-
> ment groups for the opportunity to interact more closely with COSATI in its
> studies, deliberations, national-systems planning, and standards development.
> To the maximum extent permited by its slender staff resources, augmented by
> help from the Federal agencies, COSATI sought to maintain contact with in-
> terested groups among professional societies, industrial associations, li-
> brary organizations, and others. The establishment of the NAS-NAE Committee
> on Scientific and Technological Communication (SATCOM) to improve dialogue
> with the nongovernment scientific, technical and information communities re-
> sulted largely through the initiatives of COSATI and the Office of Science
> and Technology.

The Report states that the third example of the COSATI role is seen in the formation

of its sixth panel on Information Analysis Centers, advocated in the PSAC report on

Science, Government and Information (1963) that suggested that "the specialized inform-

ation center backed by large central depositories might well become the dominant

means for transfer of technical information' and that it "behooves the technical com-

munity, at this early date in the proliferation of specialized centers, to learn what

makes a good specilized center, and to plan new centers accordingly." The prolifera-

tion of these centers was recognized, but there was also a need for "better under-

standing in this burgeoning field." Shifting to the present, it would appear that

while the Federal government still supports a respectable number of information anal-

ysis centers, the expectation expressed in the PSAC report that these centers "might

well become the dominamt means for transfer of technical information" has hardly come

fruition. This does not mean that the concept should be discarded. Undoubtedly,

Federally supported information analysis centers have contributed significantly in

the last two decades. Unfortunately, the Federal government has not undertaken a major

[1] Ibid, Page 2.

study in recent years to appraise their value and what needs to be done to make
PSAC
the still-respected/recommendation that they be supported much more of a reality.

Considerably more attention has been centered on STI databases and networks to ac-

cess them electronically than on how to provide "quality" STI to specific users during

the last two decades.   Had an organization such as COSATI continued to function dur-

ing the intervening years, the probablility that there would have been more progress

in perfecting specialized information centers seems to be a reasonable one.

COSATI also expressed pride in its program dealing with information sciences technology.

Dr. Ruth Davis was the Chairman of the panel organized to study this growing field.

There were good reasons for organizing this panel as pointed out in the 1966 Report: [1]

> The world is being impacted and compacted by unparalleled advances in com-
> munications technology, such as computers, microphotography, xerography,
> communications satellites, television, cathode ray tube and other visual dis-
> play techniques; significant progress has also been made in advanced manage-
> ment, operations analysis, and systems development techniques. These new
> tools bring new knowledge and new opportunities that may help us solve com-
> plex problems and register new gains in science, technology, and hopefully,
> human interaction. Although hundreds of millions of dollars have been and
> are being spent on applied research and technology in communications, too
> little has been done in inventorying and publicizing this work. Because
> there is evidence to show that even greater investment will be needed and
> made in the future by the Government agecies, and for other reasons, COSATI
> established a Panel on Information Sciences Technology.

The Report described the first substantial product of the Panel, an analysis and inven-

tory of Federal agency programs in this field, which identified some 1,300 projects.

The Panel found that those individuals who operate information sciences R&D programs and

those who are charged with the supervision or management of agency STI programs do not

necessarily communicate one with the other. It was agreed that the Inventory created

by the Panel be continued for three years and that the inventories be made available

through the Clearinghouse for Federal STI (now the National Technical Information

Center) of the Department of Commerce. The Panel maintain close relationships with re-

cognized experts in the government, industrial and academic communities involved in

information R&D. This was yet another undertaking of COSATI, which if continued over

[1] Ibid, pp 2 and 3.

the intervening years, might have made a considerable difference in how the Federal

agencies had employed new information technology in their R&D and other programs.

The barrage of complaints about Federal information, data-processing and communica-

tions programs that have been made in the last decade might have been fewer, if the

Executive Office of the President had the foresight to continue the program in one

way or another at the Executive Office of the President level.

The fifth program of COSATI that was attracting close attention in the United States

and abroad, according to the 1966 COSATI Progress Report,was the Planning of National

Information Systems. According to the Report: [1]

> Perhaps the most ambitious of COSATI undertakings up to now involves
> the entrance of a task group into the complex area of planning for
> national information systems for science and technology. The stated
> objective of the task group made it clear that it was not interested
> in advancing a proposal for a Federally-operated "big, all-inclusive,
> information brain," but rather in opening a dialogue leading to the
> development of a harmonious array of public and private information
> centers and facilities to support science and technology.

The Report stated that while the final chapters were still to be written on the ven-

ture, a few preliminary observations were possible:

> The most obvious effect...was the galvanizing effect upon profession-
> al societies, library groups, industrial associations, and even other
> countries. To all of these it signalled the interest of the Federal
> government in structuring and supporting large, integrated information
> systems. Domestic groups dusted off plans they were working on, or, if
> they had none, quickly set to work to prepare plans to support the in-
> formation needs of their members. Some Federal agencies began to con-
> sider how they might expand their information programs to support na-
> tional missions. The library community especially sought to partici-
> pate, as witnessed by the formation a national committee to interact
> with COSATI, the birth of the Interuniversity Communications Council
> concept, and the quickened pace and new programs for the Library of
> Congress. It is believed that international societies like the Or-
> ganization for Economic Cooperation and Development (OECD), the United
> Nations Educational, Scientific and Cultural Organization (UNESCO),
> the North Atlantic Treaty Organization (NATO) , International Coun-
> cil of Scientific Unions (ICSU), the European Nuclear Energy Agency
> (ENEA), and others, were stimulated to action at least in part by the
> COSATI national systems program.

A more sobering note was struck by the Report vis-a-vis the national systems program;

[1] Ibid, page 3.

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It was abundantly clear that not all of the response to the COSATI entrance into national planning has been enthusiastic. There is skepticism on the part of those who object to any kind of national planning on the part of the government as a matter of principle. The announced responsibility that the government is willing to assume - ensuring that there exists within the United States at least one copy of each significant publication of the world-wide literature - is questioned on the dual grounds that (1) this implies that the Government will have to be prepared to develop critieria of "significance" and underwrite national national listings and indexes for the documents, and (2) even though a Federal agency would only have review authority, it may the potential to establish a single information pattern for the country. While there is more or less general agreement that the Government "ought to do something," there is disagreement on what the Government should do.

The Report goes on to point out that the COSATI national systems program is bound to have a continuing impact when:

the recently completed Systems Development Corporation study on abstracting and indexing, commissioned by COSATI and financed by the National Science Foundation is released; and when two other studies supported by DOD's Advanced Research Projects Agency (ARPA)on informal communications among the nation's scientists and engineers, and nationwide systems for handling scientific and technical data (Science Communication, Inc.) are completed. These three studies may result in improvement of information systems and services quite apart from whatever actions are recommended by COSATI for the Federal agencies.

More about these reports will be written subsequently, but returning to the 1966 Annual Report, the next section which discusses the roles and influence of COSAT is devoted to "The Trend Toward International Information Systems." Acknowledging that there has been a long history of attempts to improve the international exchange of STI on the part of governments, professional societies, international organizations and individuals in the private and public sectors, the Report states:

Federal agencies have been diligent in trying to improve their knowledge through international data gathering, but they have been less successful in developing coordinated programs to acquire, share, and disseminate materials.

To make headway in solving many problems in the international area, COSATI took an important step forward in forming its Panel on International Information Activities to help underwrite progress in this area. The Panel was successful in devising two Federal guidelines on the domestic and foreign dissemination of machine-readable indexes that were accepted by COSATI and its parent body, the Federal Council for Science and Technology. These guidelines represented a more coherent and unified approach for exchange, sale, and employment of magnetic tapes containing bibliographic in-

formation. The Report states: [1]

> This is of paramount importance as nations begin to rely on the use of
> computers to control the mountainous growth of literature and data. The
> need for compatibility is becoming pressing, especially with the trend
> toward national and professional society-based information systems.

The Report also discloses that there was agreement in COSATI that all Federal agencies

seeking to establish international programs in particular fields will carefully de-

scribe their intentions   before taking action. Through this device, it was expected

that there would be less possibility that new problems and complications would arise

in the future, especially with the advent of mechanized information systems. The new

Atomic Energy Commission international information exchange was the first such program

to be thoroughly discussed in COSATI.   There were other agreements made by COSATI memb-

ers. For example:

> international information exchange should be based on reasonable recipro-
> city, and that for the foreseeable future, data exchange should be arranged
> and maintained between international mission or discipline-oriented groups
> rather than through a single, large, domestic clearinghouse. Thus, AEC
> and NASA will employ their scientific literature outputs to obtain recipro-
> cal foreign inputs, rather than depending solely on release of their mater-
> ial through the Clearinghouse for Federal STI and voluntary reciprocation
> by foreign countries.

The Panel on International Information Activities,which was chaired by Melvin S. Day

of NASA, quickly picked up widespread prestige and became an advisor and consultant

to international organizations, such as OECD and NATO, as well as the Department of

State. In March 1966, panel members participated with senior Soviet information au-

thorities in "frank and open discussions about national and international information

programs and problems." There is little doubt that the lack of an experienced and com-

petent panel made up of information managers and scientists in the Federal sector

today is a grievous mistake that is costly to American citizenry and to the rest of

the world. Some of the recent decisions to curtail the flow of unclassified Federal

STI have been made without the involvement of the Federal STI management communigy.

[1] Ibid., page 4.

The 1966 COSATI Report also discloses the formation of a group to make recommendations leading to the improvement of technical writing. This need was a major thesis of the 1963 PSAC Report on "Science, Government, and Information." It was also a concern of the 1966 Conference in Washington, D.C. of the American Assoication for the Advancement of Science (AAAS).

The uniqueness of the COSATI movement is further demonstrated in the 1966 Progress Report in its willingness to look at difficult problems and issues across-the-board. One of these areas was the need for greatly improved management of Federal STI programs. To make inroads on the problem, COSATI formed a panel on the Management of Information Activities. The challenge is made in the 1966 Report: [1]

> The very open-endedness of "big science and technology" is posing a problem
> of large dimensions to those involved in the development and perfection of
> supportive information systems. How can efficient, economical information
> systems be built to control the flood of lieterature and fill the needs of
> scientists and engineers, yet keep the systems sufficiently flexible so that
> they can bend with constant change that is the hallmark of science?...

"Big information" programs, not only in Federal science and technology, are growing rapidly, the Report points out:

> Despite the sizeable amount of resources being poured into ifnformation sys-
> tems, an amount that we can only estimate today, very little is knwon about
> the management of large information systems. We do not know the principles
> of effective management, nor do we have recognizable criteria to measure per-
> formance of information activities. Even the thesis that there is a problem
> is not widely recognized. For example, some scientists and engineers who
> traditionally think of information-handling only in personal terms, and cer-
> tainly not as an institutional problem of magnitude, are wont to dismiss
> the information handling problems as either a fabrication of a matter of mar-
> ginal concern.   COSATI and its sponsors see the problem in a different light.
> They see the appearance and growth of medical, toxicological and chemical in-
> formation systems, patent information programs, state technical information
> programs involving technology transfer and utilization, science information
> (current R&D programs) exchanges, clearinghouses, referral centers, informa-
> tion centers and depositories numbering in the hundreds, reference data sys-
> tems, and technical report distribution centers. They see the emergence of
> training and education requirements for STI personnel. They are aware of the
> huge outlay for information sciences technology, of the increasing costs of
> publications, of the growing expense of "page charges," and of the problem
> of providing guidance to Gevernment agencies and others to determine what
> data are provided free or for a fee.

To undertake studies and make recommendations to improve Federal STI management, a

[1] Ibid., pages 5 and 6.

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number of action groups were recommended by the Panel: a unit-cost analysis group
to compare documentation costs and criteria of the COSATI agencies, a scientific
and technical information activities and funding inventory group, a program and budget
planning/cost effectiveness group, and a user charges group.

The final "general" section of the 1966 Report describes the efforts underway in
the Panel on Operational Techniques and Systems. It provides a context in these
words: [1]

> While there is evidence to show that some of the focus of interest in
> the COSATI community has shifted to national planning and improvement of
> international interchange, the vast bulk of COSATI's day-to-day efforts
> continues to be in the coordination and betterment of Federal agency
> STI systems and techniques. The Panel on Operational Techniques and
> Systems is the group responsible for the spadework that has resulted in
> a number of standards, guidelines, and agreements, dealing with micro-
> fiche, corporate author lists, descriptive cataloging, and subject cat-
> egory lists that are in use throughout the Government, and increasing-
> ly, outside of government. State-of-the-communications-art is changing
> so rapidly and the problems facing the Federal agencies are so acute that
> traditional standards-developing groups have not been able to adequately
> fill the gap, thus stimulating COSATI to take actions and provide at least
> temporary leadership in this field.

There are two other efforts of this Panel that should be mentioned. The first of
these is the organization of a group to help formulate a recommended policy on and
encouragement of "Freedom of Information" support, an area that was receiving con-
siderable attention in the Legislative and Executive Branches, and, of course, in the
media. The task force is being asked to make recommendations leading to reduced ad-
ministrative withholding of unclassified informatioon resulting from the Federal R&D
programs. The second effort involves the preparation of a two-day COSATI seminar on
Government STI Systems. The purpose of the seminar is to highlight a number of Federal
agency advanced information systems in operation or in the developmental stage.

The strong support of Science Advisor to the President,Donald Hornig, not only re-
sulted in a vigorous COSATI program, it was also having a positive effect on the work
of other FCST Committees. For example, in the report of the Committee on Water Re-

[1] Ibid. Page 6.

sources, setting forth a 10-year program, there is a statement that underscores this committee's interest in STI   (pages 19-20): [1]

> As in most branches of science and engineering, there is an urgent need for a system which can permit ready retrieval and dissemination of research results in water resources. Accordingly, the Committee on Water Resources Research established in early 1965 a Subcommittee on Information Retrieval.

The Subcommittee was directed to work closely with COSATI so that there would be no overlap in functions. It was also directed to steer clear of recommending programs that would duplicate the dissemination of field data, such as precipitation and streamflow observations, maps, surveys, etc., for which services already exist. COSATI invited the Subcommittee to come to its meetings and to ask for whatever help it needed in the STI area.

Early in 1966, the COSATI Task Group on National Systems for Science and Technology came to a decision that forms of scientific and technological   information other than documentation required attention. Three system areas that fell into the "other" category were abstracting and indexing services, oral and informal communications, and data collection reduction analysis and dissemination. The National Science Foundation was asked to provide funds for the contracts that would be let in these three areas and also provide contract administration. As in the document handling systems, the Task Group was asked to provide technical guidance to the contractors. In the case of the abstracting and indexing services, the contractor was asked to specify the optimal role of these services, especially as they may exist some ten years hence. The study would define the present status and effectivenesss of current abstracting and indexing services, and would recommend actions to be taken by the Federal Government to bring about desired improvements, including the creation of new services. The oral and informal communications study was ordered because of the importance of oral and other informal means of communication for scientists and engineers that

[1] Committee on Water Resource Research, Federal Council for Science and Technology, A Ten-Year Program of Federal Water Resources Research, Office of Science and Technology, Executive Office of the President, Washington, D.C., February 1966, pp 88.

[2] Knox, William T., Status Report for Scientific and Technical Information for December 1965 to the Office of Science and Technology, Washington, D.C., 6 January 1966

had been repeatedly emphasized by users studies over the past ten years. The Federal Government at that time was underwriting scientific and technical meetings, as an example, to the tune of about $40 million a year. With the movement towards computer-based information systems, the Task Group reasoned that it was essential to learn more about the role of informal communications. Like the study on the role of oral and informal communications, the data collection reduction analysis and dissemination study was to be exploratory in nature. The purposes of the data study were to identify the uses that data in various formats play in the technical decision process, the assessment of current management by government of the data collection and dissemination process, and the recommendation of policies and actions that would be desirable to increase the efficiency of research and engineering applications.

Just after the decision was made to contract the three studies, Knox informed the COSATI Steering Committee that three new COSATI panels were needed: the Panel on Information Program Management to be chaired by Walter M. Carlson, DOD, the Panel on Information Community Relations to be chaired by Edward J. Brunenkant, AEC, and the Panel on Information Generation, Transfer and Use to be chaired by Burton W. Adkinson, NSF.[1] He carefully listed the reasons why the panels should be formed and what results might be expected. The Steering Committee evaluated the proposal but then voted that COSATI should not expand its efforts at that time, because of the considerable workload that it was experiencing. This was of concern to Knox and other OST staffers, who continued to see new information needs and opportunities that deserved attention. One example involved the need for special efforts in problem-solving and crisis management areas of national interest. The OST staff felt that such programs were not being adequately served by the mission-based information systems of the agencies that were established to serve whatever the function of the agency was, nor by the discipline-based information systems of the professional societies. The members of COSATI acknowledged the existence of the problem, but they felt that they were doing

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[1] Knox, William T., New Panels to be Considered by the COSATI Steering Committee at its 10 January 1966 Meeting, a memorandum dated 7 January 1966, pp 5.

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all they could do to operate their own agency programs and support the COSATI pro-
grams at the same time. Moreover, it was not clear to them what COSATI could do to
better serve the problem-solving and crisis managing information needs of the Fed-
eral government and the nation. It was pointed out that we still had a long way to go
to bring information center and research library programs together, to improve the
transfer and application of government-generated knowledge to the private sector, and
to educate and train information specialists and scientists and engineers in the use
of modern information resources. On the other hand, the OST staff made their views
clear that scientists and engineers were being confronted with a range of issues and
problems dealing with poverty, urban problems, education, air and other pollution,
control of pesticides, massive oil spills, and many more. It was their view that the
Federal information managers had to contribute through better information systems to
the solution of these problems, and that the Federal science and technology community
would be judged by the citizens as unresponsive if they did not make inroads on the
problems. It was agreed that the problem of information-handling is complicated by
the complex mix of scientific and engineering disciplines, fiscal and legislative
problems, competition for missions by the agencies, and by a whole host of social,
cultural, political and economic problems. It was decided to put the formation of
additional COSATI panels or task groups on the "back burner" for the next few months
so that more time and effort could be focused on the national system program. While
this agreement appeared to be reasonable, it did not stop the leaders of COSATI from
seeking new ways to serve science and technology. For example, a new task group on
Data for Productivity and Innovation was considered during the early part of 1966.
Terms of reference for such a group was prepared by the COSATI Executive Secretary.[1]
The objective of the Task Force was to study the role of information and data as tools
which contribute positively or negatively to the process of technological development
and offer recommendations for action by the Federal agencies for improvement, consistent
with the public interest, of information and communication practices. Additionally,

[1] Committee on Scientific and Technical Information, Terms of Reference for the
Task Group on Data for Productivity and Innovation, Washington, D.C., February
1966, pp 2.

Additionally, the Task Group was asked to make recommendations leading to improved transfer of new knowledge necessary for productivity and innovation. Like the other proposed panels and task groups, this one was not formed by COSATI. In light of the present quest for improved productivity and innovation, one can only conjecture what the result would have been if such a task group had been established and kept alive over the years.

An interesting inside look at COSATI was made at the COSATI Steering Group meeting in January 1965 by the members. [1] Excerpts are provided as follows:

1. <u>Chairman Knox</u>:

   The prestige of COSATI has grown inside and outside of government. The agencies have made a considerable investment in it. I would like your views about COSATI in the future.

2. <u>Edward Brunenkant, AEC</u>:

   I agree that COSATI has made an impact on the information community in and out of the government in the last three years. COSATI's product has not equalled the amount of effort put into it. Outside grouos should not be represented in COSATI, except informally, but we have to avoid government bias in what we do.

3. <u>Melvin S. Day, NASA</u>:

   COSATI has filled a needed vacuum and provides a vehicle and focus for action. Its contributions in the microfiche and descriptive cataloging have been most important, as has been its role of a central reference point. COSATI's existence has resulted in a crystallization of action <u>outside</u> of COSATI. It has been the first successful group to get large groups together and this applies to people and groups within the government. COSATI is far more than a talking function; it has been a working committee made up of people who want to do something about problems. It will be even more effective in the future if OST continues to rely on it.

4. <u>Walter Carlson, DOD</u>:

   COSATI is an effective tool. Its success is keyed to its usefulness in the administrative process. Only if FCST members are prepared to coordinate can COSATI be successful. COSATI formation and activity had set the stage or improved the climate for FCST work. It should get into the budget cycle in coordination with BOB. I see the larger information problem less in scientist to scientist communication and more in scientist to engineer, research manager to development designer. This is where the gaps in transfer of information exist. COSATI should move in this direction.

5. <u>Burton Adkinson, NSF</u>:

   COSATI provides a needed forum and a "rubber stamp" for what others are doing. Its most successful attainments are those dresulting from work done by small

[1] Aines, Andrew A., Minutes of COSATI Steering Group Meeting of 10 January 1966, Washington, D.C., pp 3.

task groups. The tacit backing of COSATI by OST contributes substantially. COSATI is needed to give government-wide endorsement, but it takes many man-years of work to get accomplishments. The key that makes a considerable difference is the attitude of OST.

6. Charles Kidd, Executive Secretary, FCST:

    I would like to point out that any group with surveillance over the field was bound to be a rubber stamp. FCST is the same; the process of legitimizing things is necessary and provides a needed mechanism.

7. Ellis A. Johnson, DHEW:

    Physicians are organized internationally and have little to do with hard scientists. They have a tremendous ability to communicate, hence feel the need for COSATI less. Both physicians and educators feel little need for more organization, although I believe that organizations like DOD and NASA need more coordination. Knox commented that the Commission on Heart Disease, Cancer, and Stroke was in favor of more action in the information area.

In general, there was a feeling of confidence among the leaders of COSATI that through its actions the strength of the Federal STI program was improving and that the Federal R&D leaders were fully supportive of the COSATI efforts. The belief in the program brought other dividends. One of these was wide agreement that it was time to establish a uniform, government-wide research project reporting system. During the early 1966 period, the Federal STI managers accepted the philosophy that they were responsible for all scientific and technical information programs of their agencies. These included the acquisition of outside STI, the establishment of full scale information retrieval and dissemination systems, the payment of page charges to not-for-profit scientific and technical journals, providing tailored services for individual scientists, engineers and R&D managers, participating in technology transfer programs, interacting with the public and private sector information programs, arranging for publishing the output of agency researchers, developing programs and budgets, establishing feedback systems from various groups of users, and many other functions. In recent years the spectrum of responsibilities for Federal STI managers has narrowed. They are less involved or in charge of agency research-project reporting systems. But during the early and mid-1960s, there was considerable ferment to improve agency and government-wide project reporting activities of the agencies. It was an area of deep concern in congressional quarters, where hearings were held on the subject. Many meetings were held on research project reporting systems by the Office of Science and Technology and

2.3.3

COSATI.

In the Spring of 1966, a survey was undertaken COSATI Chairman, William T. Knox [1]
of the Federal agencies about their interest in participating in a government-wide
uniform research project reporting system based on the method adopted by DOD and
NASA, which employed the DOD input form 1498 and the NASA input form 1122. Based on
the findings of the survey, Knox concluded that"the time is ripe to move ahead on a
government-wide basis." In the memorandum, Knox summarized the positions of each of
the Federal agencies.   In effect, each stated that it had established a reporting
system similar to the DOD-NASA approach or it was. using the reporting system employed
by the Science Information Exchange, however, all were willing to shift to a uniform
government-wide approach. Knox suggested in the memorandum that a target date of June
1, 1966 be set for the adoption of the DOD-NASA approach. He asked Dr. Hornig to
appoint Chalmers Sherwin, Department of Defense, as the chairman of an ad hoc FCST com-
mittee to agree on procedures and at timetable for implementation. At this time, the
Science Information Exchange had an Advisory Committee that was set up by Burton Ad-
kinson, NSF, whose office supported the SIE operation. Knox recommended that the SIE
Advisory committee be consulted by the FCST ad hoc committee operating under the leader-
of Dr. Sherwin. Knox believed that SIE should operate the government-wide project-re-
porting, but only after it agreed to use the uniform government-wide system. Up to this
point, SIE had refused to take on responsibility for establishing the new uniform
project-reporting system. Although SIE Was supported by NSF, it was located in the
Smithsonian Institution and like its parent group was independent of the Executive a-
gencies, including NSF, when it did not want to cooperate. Dr. Hornig agreed with
Knox and took two actions. He invited Dr. Sherwin, who was then the Deputy Assistant
to the Assistant Secretary of Commerce for Science and Technology, to chair the FCST

[1] Knox, William T. Memorandum to Donald F. Hornig, Director of the Office of Science and
Technology, Executive Office of the President, Washington, D.C., 27 April 1966

2.3.3

ad hoc committee,[1] and sent a memorandum to the members of FCST asking them to nominate a representative who would be at the research policy management level.[2] Sherwin and the members of FCST agreed and the task group was organized.

As more attention was given to the issue by Congress which passed two resolutions (S.J. Res. 202 and H.J. Res. 666) calling for improved departmental and agency information systems and establishment of a Presidential Advisory Staff to monitor the program, Knox called on the Science Adviser to designate a Special Assistant to the President for Information Systems Management, who would also be an Assistant Director in the Office of Science and Technology.[3] He cited as reasons for his conversion to this view the accelerating revolution in the technology of information systems and the unawareness of most managers of the potential benefits from using modern information systems, aside from conventional ADP uses. It was his view that most managers were unable to stimulate and guide application of new information technology within their own programs at a pace commensurate with the needs and available solutions. This failure was especially visible in depart ments and agencies weak in technology-oriented programs. The process was slow, even in technology-oriented departments like DOD and NASA even with the intervention of information systems-minded managers. Knox cited the view that was becoming fixed in OST that users of any information system must see the system as a vital part of their work, must be actively involved in its operation, and must be willing parties to any changes in it. It would be the function of the Special Assistant to the President for Information Systems Management to motivate, to educate and to lead managers of Federal programs with respect to modernized information systems. Science and technology would be only one of the areas to be given special attention; education, transportation, social sciences (including economics), the humanities, law, foreign affairs, regulatory agencies, and possibly civil rights would also be included. In his memorandum, Knox considered the placement of the Special Assistant in the Bureau of

[1] Hornig, Donald F. Memorandum to Chalmers Sherwin, Department of Commerce,(Sherwin had just completed a move from DOD to DOC.), 11 August 1966, pp 1.

[2] Hornig, Donald F. Memorandum to members of the Federal Council for Science and Technology, Washington, D.C., 11 August 1966, pp 1.

[3] Knox' Memorandum to Donald F. Hornig, dated 8 March 1965, pp 9.

the Budget, the Office of Emergency Planning, and the Office of Science and Tech-
nology. In light of the emergence of the Office of Management and Budget as the key
ADP group in the Executive Office of the President in recent years, it is interest-
ing to review Knox' thoughts on the subject. A major disadvantage to putting the fun-
ction in BOB is the pervasive image of BOB as being more interested in cost and man-
power reduction than as a leader in technologically-based managerial innovations.
Moreover, it would be more appropriate for BoB to sit in judgement on departmental
and agency proposals in this field. OST, he observed, interacts more freely and
effectively with non-Federal groups, and Federal-State-local information systems
would be an important area of activity by the proposed office. Knox also observed
that there would have to be a major reshuffle in BoB since it had two assistant
directors with partial responsibilities in the area. After dismissing the wisdon of
turning the function over to the Office of Emergency Planning, Knox concluded that
only OST seemed to be the logical leader in this new program. He also suggested
that the task of achieving integrated national and international information systems
in science and technology was so huge that there be no change in his dual role of
chairing COSATI and maintaining his OST responsibility. He was not a candidate for
the proposed post of Assistant Director of OST for Information Systems Management.

Here is another recommendation that went unfulfilled and one can only conjecture what
might have transpired if Hornig had aggressively sought to have this new function
added to the responsibilities of OST. Had this very necessary function been handled
with the vigor that OST was applying in the STI area, the chances for greater success
in using new information technology by the Federal agencies and departments would
have been more advanced than they are today. BoB's successor, OMB, is still experi-
encing difficulties in "managing" this area, even though it has a public law that
gives it such a responsibility.   Knox was correct in 1965 that OMB is more interested
in keeping a lid on cost and manpower than playing a bold leadership role. Based on
the difficulties that OMB is having currently, it is true today. OMB is not built
to be an innovating force as OST was in the decade of the 1960s, although credit

is due to BoB's Assistant Director, William D. Carey, and the BoB's examiners' group guided over the years by Hugh Loweth both of whom worked diligently with the Office of Science and Technology to improve the effectiveness of the Federal R&D and Federal STI program during the 1960s. Knox was disappointed that his recommendation did not receive attention, but it was perhaps too much to ask the Science Advisor to take on another major function that would require OST to get involved in Federal ADP programs across-the-board. Unfortunately, no other White House group was available or anxious to accept the role. In consideration of the increasing importance for the Federal establishment to improve its information management functions, it was a missed opportunity.

During the early part of 1966, COSATI could tell the Federal agencies that the Russians were coming. Indeed in February of that year, COSATI acted as the host to seven STI specialists from the Soviet Union, who were visiting the U.S. as a result of a cultural exchange agreement. The group was headed by N.B. Arutyunov, the senior information systems executive for the U.S.S.R.State Committee for Coordination of Scientific Research. All of the seven were fluent in English. They were overwhelmingly interested in the use of computers for information storage and retrieval and made no secret about learning what we were doing. They were quite open in admitting their relative backwardness. They made it clear that they were anxious to improve information-handling relations with the United States, but they also amazed the members of COSATI by their willingness to accept English as the lingua scientifica. The Department of State was informed about the interests of the Soviets, but nothing came of it. The Department of State was not organized at that time to pick up the ball and run with it. One memory of the visit of the Soviet team remains clear over the years. In the COSATI "show-and-tell" program, the National Library of Medicine arranged for a presentation and a walk-through of the Library. The computer facility was not included in the itinerary. Much to the consternation of the NLM leaders, the Soviets "barged" into the computer room uninvited, so hungry were Arutyunov and his colleagues to gain information about the computer programs of the National Library of Medicine They proceded to ask many questions about the facility and its function

without any sign of reticence or embarrassment, despite the discomforture of their

hosts. The behavior of the Russian visitors provided a useful lesson to the COSATI

members, who recognized that the Soviet zeal to gather information far exceeded ours

and that we should bear this in mind when we had dealings with them. The lesson was

discussed by the COSATI Panel on International Information Activities in connection

with what the U.S. information experts should look for in their future trip to the

U.S.S.R. as part of the cultural exchange program. Unfortunately, this did not take

place. One reason may have been a chauvinistic belief on the part of Americans

that they had little to learn from the Soviet counterparts. Another reason might

have dealt with the lack of travel funds and similar problems which did not seem

to be shared by the Soviet visitors. There was one reality that the members of

COSATI were well aware of - scientists and engineers in the public and the private

sectors with a few exceptions here and there were not insisting on a much stronger

international information collection program by the U.S. government. The United States

Information Agency (USIA) had demonstrated considerable eagerness to improve its rela-

tionship with COSATI agencies to do a better job of reporting U.S. progress in research

and technology via the 250 overseas outlets that it maintained. These outlets were

not equipped to gather foreign technical information to be delivered to the Federal

agencies. This was reported in an internal OST document.[1]

The same report summarized COSATI's International Panel effort to develop a U.S.

policy on sending magnetic tapes, microforms, and other modern bibliographic tools

to foreign countries. Typical problems mentioned in the report: whether to use a

centralized agency overseas as the exclusive distribution agent; whether to make

available in the U.S.A. the same tools sent overseas (this was not then being done);

and the quid pro quo the U.S.A. should bargain for in return. Two other international

activities were discussed in the report: the meeting of the ad hoc group on national

information policies, Organization for Economic Cooperation and Development (OECD),

[1] Knox, William T., Status Report for February 1966: Scientific and Technical
    Information, dated 6 March 1966.pp 5.

where Knox was going to discuss the COSATI report on national document handling systems with emphasis on the application of the system assumptions and requirements to European countries, and the establishment of the OECD-sponsored European Nuclear Energy Authority (ENEA) clearinghouse for nuclear energy information.

In the same report, Knox wrote:(page 3.):

> The ICSU General Assembly in Bombay in January voted unanimously to ask UNESCO for funds to set up a committee on a world science information system. The proposed committee would not, in OST opinion, add a clarifying voice to the general din prevailing in international information circles. Further OST/NAS discussions will be held.

In consideration of the Administration's announced decision in 1984 to terminate its relationship with UNESCO, which took over the stewardship of the worldwide STI program - UNISIST - five years later, Knox's views might have been prophetic.

The February 1966 OST Progress Report concludes with a discussion of two initiatives to implement the National Systems Document-Handling System. The first is a bid by the Department of Interior to establish a water resources information system and act as the "responsible agent" for water resources information. The second a discussion of a U.S. medical library network, which would assign the National Library of Medicine the responsiblility of providing general basic services to local libraries and setting performance standards for local library operations. This was the recommendation of an OST-sponsored, PHS-funded study, which also addressed the need for marketing library services to medical practitioners (detail men), and buidling the system from the present base of NLM plus 15 libraries in the rest of the U.S. Knox wrote:

> Preliminary reaction from NLM and PHS has been generally negative; these agencies have emphasized library construction and book needs, and the use of Medlars tapes in various regional libraries.

Knox wound up the report with his expectation that the new joint Committee on Scientific and Technical Communications (SATCOM) of the National Academy of Sciences and the National Academy of Engineering will provide the essential high-level mechanism counterpart to COSATI for leading the professional, scientific and engineering communities in improving communications.

Earlier, William D. Carey and Hugh Loweth were cited as two BOB (OMB) officials were

helpful in the early stages of COSATI development. There was a third official in

BoB, Willard Fazar, who was both helpful and knowledgeable in the thrust for

better information systems. Though familiar with scientific and technical informa-

tion development, Fazar looked more broadly at developments and needs in the ADP area.

Independently from William T. Knox, Fazar prepared a "think paper" expressing his

views on the larger information problem. [1] He identified at least three groups

that were gaining momentum to establish an Executive Office group, a Presidential

Council or Commission with responsibility to perform, central guidance and coordination

functions over the information handling and exchange activities to serve respective

community interests. The first of these was the COSATI Task Group on National Docu-

ment Handling Systems for Science and Technology. The second, in the field of socio-

economics, was the Kaysen Report recommendation for the establishment of a Director,

Federal Statistical System in the Executive Office of the President with direct re-

sponsibility for the operations of the Office of Statistical Services, Census, and

a new National Data Center. The third is the establishment of a National Intergov-

ernmental Affairs Council (S.3509) sought by Senator Muskie's Subcommittee on Inter-

governmental Relations, "to advise the President with respect to the formulation,

implementation, and coordination of domestic policies and programs which affect in-

tergovernmental relations and the Nation's economic and social development." Fazar

added a fourth item, Senator Edward Kennedy's proposed (S.J. Res. 187) establishment

of an Advisory Commission on Intergovernmental Relations to study information inter-

change between Federal and local governments and make recommendations on the desir-

ability of developing a modern information system to collect, store, evaluate, sort ,

and disseminate information relevant to officials of States and localities. Fazar

then asked: "All four of the communities of interest are so related, overlapping, and

interacting that they pose these questions for decision: Should we establish three,

[1] Fazar, Willard, Notes on Concurrent Drives to Establish Presidential-level Organ-
    izations to Coordinate Information Activities for Different, but Overlapping,
    Communities, Nove mber 10, 1966, pp 2.

four, or more central guidance superstructures to perform comparable and inter-related functions at the Presidential level? Should we establish a single National System Program gram Office to evolve gradually the coherent and compatible Information Systems required for all categories of information, information programs, and sectors of this nation? Should we assign initial comprehensive central coordination responsibility to a group in OST, where earliest leadership and experience has been demonstrated for the development of coherent information systems?"

Obviously, Fazar was asking some key questions, but unfortunately he did not have an audience in BoB that fully understood what he was pointing out. BoB was simply not organized or knowledgeable enough to cope with his questions.   Contributing to BoB's drawing into its shell was the strong public reaction that it got when it proposed the National Data Center recommended by the Kaysan Report. It had a distinctly chilling effect that appeared to cool off BoB's pioneering in the information and data area. It may have also contributed to the lack of full support by BoB in furthering the national document-handling system proposed by the COSATI task group. It should be borne in mind that during this period there was a strong faction deeply concerned about the bruising effect that strong central government-run information systems might have on the privacy of individuals on one hand and inhibiting the free flow of information on the other. It was an emotional period. Congressional committees were holding hearings and the newspapers and electronic media played an aggressive role in challenging any government action that could be construed as potentially harmful to their own interests and to the citizens. In this kind of a climate, it was difficult to sell the notion of better engineered large scale government-managed information systems. The forces of reaction were in the driver's seat, thus blunting the support of large information systems designed to improve government functions and cut costs. Insufficient recognition was given to the clash of two desirable "goods" and the need to find an accommodation that would permit society to take advantage of the new information technology and techniques that were becoming available. The problem is still with us to a large extent, one reason why the Federal government

along with state and municipal governments have not made more progress in both per-
fecting their own information programs and coordinating their efforts to facilitate
transfer of information one to another.

During this period there were internal discussions within the OST science information
operation about the need for improved new computer-based information systems, not
only for science and technology, but for decision-making, problem-solving, and the
exchange of technical information between governmental entities at all levels.[1] At
this time, Congress had not yet made progress in organizing itself for the gathering
and handling of machine-readable data. The proposal called for the formation of a
joint Congressional-Executive Department task force on government communications
that would study the need for an interactive information system th at would make it
easier to transfer information between the two branches of the Federal government,
but also with states and municipalities. Nothing came of it. A second proposal in
this document recommended the development of an integrated Federal technology util-
ization program to strengthen the scattered "piecemeal" efforts going on in a few of
the Federal agencies.   NASA, it suggested, be asked to organize an interagency
group to determine what was going on in the Federal agencies and prepare recommenda-
tions for further actions.

In response to a request from the Director of the National Science Foundation, Dr.
Leland J. Hayworth, about /the role for NSF in light of FCST and PSAC discussions of
an integrated national network of information systems in science and technology,
Knox sent a detailed description of what he believed would be a logical program for
NSF. [2]   NSF, working closely with OST, would: (1) plan and evaluate the integrated
national network of systems and components of the system; (2) manage certain central-
ized information facilities and services, such as the Science Information Exchange

[1] Office of Science and Technology, internal proposal for future effort, dated
       November 15, 1966, 1 page,
[2] Letter from William T. Knox, OST, to the Director, National Science Foundation,
       dated 16 March 1966, 5 pages.

and centralized translation services; and (3) ensure effective national information systems in certain basic science areas, such as chemistry, biology and physics. NSF would act as a "responsible agent" in this function, Knox pointed out. On the whole, Knox reaffirmed the traditional role of NSF in acting as the Federal government's focal point in relations with the professional societies. The only new ingredient would be the formalization of the process as part of the scheme to extablish a national STI system. As pointed out elsewhere in this book, NSF has terminated its legally mandated scientific and technical information program in the last decade and with it its traditional role of assisting the non-profit information (scientific societies) community.

In early 1966, it was evident that the scientific and technical information affairs of the Federal agencies were growing apace with the government-wide R&D programs. It was decided to establish a COSATI steering group to achieve better coordination and control, a panel that would meet on call, focus on procedural matters, and generally provide advice to the chairman. It was further agreed that there should be no charter for this group. At the first meeting of the steering group, Knox asked each of the attendees

In early 1966, there was a staff discussion in the Office of Science and Technology dealing on what was described as national social-engineering problems and information systems designed to contribute to their solution. An internal memorandum [1]

> "...we are beginning to find that scientists and engineers are viewing such programs as elimination of poverty, urban development, education, air pollution, control of pesticides, water pollution, transportation, housing, etc. At this stage, most concern is for the removal of inequities in the distribution and use of resources and for long-range planning. The surge of these problems is taxing Administration groups who are involved in whole or in part for solutions. Some of the problems are distributed among a number of agencies. New agencies such as the Department of Transportation are being formed to cope. The problem of information-handling is complicated by the complex mix of scientific and engineering disciplines, fiscal and legislative problems, competition for missions, and a host of social and cultural considerations. The question

[1] Office of Science and Technology, "Suggestions Involving Information Management," dated 26 January 1966, 1 page.

> to be asked and answered is--what course of action or actions could be taken to employ modern information-handling methods to contribute to a the solution of social engineering problems.

The discussants recognized that there was a long way to go before it would be possible to engineer information systems that would handle a mix of a variety of different kinds of information and data - scientific, technical, economic, social and the like. A few studies were undertaken to explore this subject by the National Science Foundation in the 1970s, but unaccountably little attention has been given to the need of such information systems in the intervening years up to the present.

In a field more or less related to the above, it was proposed by COSATI to create a task group on data for productivity and innovation. The objective of this panel was the study of the role of information and data as tools which contribute positively and negatively to the process of technological development and to offer recommendations for action by the Federal agencies for improvement, consistent with the public interest, of information and communication processes.[1] It is interesting to note that as early as 1966 there was recognition that there was a need for more vigorous action to achieve productivity and innovation. In 1983, the White House Conference on Productivity and Innovation was undertaken and a major report prepared on the subject. The target for the task group was productivity and innovation for/science Federal and technology, while the White House Conference on Productivity covered the national effort.

While on the subject of productivity and innovation in science and technology, in a talk made to a group of Federal executives in 1966,[2] Knox, in describing the goals of the OST-COSATI information progam, stated: "While our pretension is modest, perhaps we can do something to bring about or facilitate the next upward spiral of productivity in research and development." However, the proposed COSATI task group on productivity and innovation was not established, one reason being the fear that the top Federal information managers were investing too much of their time on COSATI matters.

[1] Committee on Scientific and Technical Information, Federal Council for Science and Technology, Terms of Reference for the Task Group on Data for Productivity and Innovation, Washington, D.C., November 1966, 2 pages.

Interagency Coordination of Scientific and

2.3.3

Recognizing that there was continuing concern in the private sector and some

quarters in the public sector about the mounting of the National Scientific and Tech-

nical Information Systems effort, the COSATI Chairman, William T. Knox, took on

the difficult task of orienting information and other groups within and outside the

government about the program. His purpose was to reduce the fear that the

Executive Office of the President was going to take over command of all of the scien-

tific and technical information programs of the country. Addressing a group of

physicists; he said:

> In discussing information-system development, I feel in a way like a
> missionary. I don't mean in the sense of propagating the faith that
> some of us have that progress in science and technology can result
> from better information handling. I mean, rather, in advocating a
> partnership of the government and the private sector in fashioning the
> tools -- the information systems --that will meet our present and fu-
> ture needs. I stress the word partnership because I sincerely believe
> that although federal information system improvement is a vital in-
> gredient, the larger need is national information system improvement...
> Without your participation in the planning and execution of national
> systems, progress will continue to be slower than it need be.

He then went on to explain that COSATI's concerns:

> embrace not only systems that actually transfer documents and inform-
> ation from one user to another. They also embrace initial publication
> processes and producers of information, user groups with their varying
> information needs, education and training of information system opera-
> tors, and producer-user groups of modern information systems. Informa-
> tion systems also have their own large research and development pro-
> grams. COSATI's concerns are very broad because they are related to all
> scientific and engineering disciplines and to all of technology.

He pointed out that following several suggestions from committees of the Congress

that the Executive Branch exercise stronger, more aggressive leadership in this

area, an interdepartmental COSATI task group began to develop the conceptual frame-

work for a plan to improve the overall complex of scientific and technical informa-

tion activities in the United States. He went on to explain that OST and COSATI

took the criticism of the Congress very seriously. In addition to the blue ribbon

[1] Knox, William T ., The Government Makes Plans, Presentation at the American Physical
Society's Symposium on Information Storage and Retrieval, New York City, 29 Jan-
uary 1966, 14 pages.

panel established by COSATI, a study team from the Systems Development Corporation assisted in the effort.

Knox travelled to New York City to carry the message to the publishers and editors of the nation's technical publications. This body of knowledge consisting of several hundred technical magazines carrying fresh technical information and advertising is uniquely American, at least in terms of the quantity published and the quality of the material presented. After explaining that his subject was of more direct interest to scientists and engineers in the United States and abroad who are busily at work devising technology that will reshape our society in the years ahead, he stated: [1]

> No segment will be immune from this reshaping, not even the business press. So while my subject may not affect you so directly and immediately as changes in the tax regulations or postal services, in the end it will be even more important. Let me define the subject then -- I am talking about the vast, complicated, sophisticated communications network through which research and engineering results are brought to bear on people's problems. Not just the problems of other scientists and engineers -- but everyone's problems. I am talking about libraries and technical meetings; the business press and basic research journals; books and facsimile transmission; results 100 years old and concepts still in the scientist's mind; people and also machines. Somewhere in the communications network supporting the further progress of science and technology, all of these things have a role to play. You can think of other network components I've left out; these are important too. Now, what government actions in this area are worth your attention? Some specific programs are already known to you -- such as the greatly expanded library assistance programs and the copyright law revision. But you may not be aware of the intensive planning effort within the Executive Office of the President, an effort focused on the overall national network of information systems in science and technology.

As Knox toured the information circuit in and out of the Federal government, he began to recognize the vast difficulty of implementing the recommendations of the National document handling system that received the approval of the Federal Council for Science and Technology, especially the establishment of the central mechanism for the system that was to be initiated by the Director of the Office of Science and

[1] Knox, William T., Talk Before the American Business Press (Incorporated), Waldorf Astoria, New York City, February 16, 1966.

Technology. He recognized that there would have to be a strengthened information systems organization within the National Science Foundation to provide OST with the required support.   This subject was discussed with Burton W. Adkinson earlier in December 1965. [1] Knox apparently became concerned that it would be difficult to get additional staff within OST and the help that he would need from the National Science Foundation., whereupon he prepared an interesting memorandum to the Director of OST, Donald F. Hornig.[2]   In this memorandum, he concluded that as a result of his experiences during the last 17 months:

> There is a genuine need for centralized, high-level leadership in the Federal Government for improving departmental and agency information systems, inter-departmental information systems, and Federal-State-local governmental information systems...I now believe that a Special Assistant to the President for Information System Management (as Assistant Director of OST) would be desirable and timely.

He pointed out that the sponsors of the congressional resolutions (S.J. Res.202 and H.J. Res. 666) calling for the formation of a Presidential Advisory Staff in 1965, the PASSIM resolutions, saw the need for a stronger information management program in the Executive Branch. Knox cited his own views why a Special Assistant should be created: the accelerating revolution in the technology of informat ion systems, the technically more difficult task of designing non-numerical information systems; and the unawareness of most managers of the potential benefits from using modern information systems (aside from conventional numerical uses). He wrote:

> The result is that most managers are unable to stimulate and guide application of new information technology within their own programs at a pace commensurate with the needs and available solutions. ... Even in such technology-oriented departments as DOD and NASA, it has taken several years, plus the major intervention of information systems-minded managers, to get a few basic information systems begun. Also, since revision of existing large information systems or creation of new ones, requires several years (or more) to complete, there is need for top management continuity, which is not found uniformly throughout governmental organizations.

It was his view in the past, Knox wrote that users play a key role in creating and operating information systems, but has amended his views based on his new belief that:

[1]   Letter from Burton W. Adkinson, NSF, to William T. Knox, OST, March 23, 1966 and response from Knox to Adkinson, dated 28 March 1966.

[2] Memorandum from William T. Knox to Donald F. Hornig, Office of Science and Technology, Special Assistant for Information Systems Management, 8 March 1966.

> I now believe that this process will be very slow, much slower than
> it need be, because of the lack of adequate managerial motivation
> and know-how.

Knox continued:

> The primary functions of the Special Assistant would be to motivate,
> to educate and to lead managers of Federal programs with respect to
> modernized information systems. Much of the motivation would result
> from the explicit expression of Presidential interest. The office
> would take a broad look at information systems plans and programs
> throughout the government, and would make suggestions for modifi-
> cation or revision. It would sponsor seminars designed to educate
> and motivate top-level Federal, State, and local managers of inter-
> governmental programs. It would assist departmental and agency man-
> agement in obtaining budgetary and legislative support for applica-
> tion of modern information systems technology.

Knox then explored the advantages and disadvantages of placing the new Special Assist-

ant in: the Office of the President reporting directly to the President or one of

his personal staff members, reporting via the Special Assistant for Science and Tech-

nology, in the Office of Science and Technology as an Assistant Director,

in the Bureau of the Budget as an Assistant Director, and in the Office of Emergency

Planning as an Assistant Director. Knox concluded his analysis by deciding that the

best site would be in OST. He wrote:

> It is, therefore, recommended that the function of providing govern-
> mentwide leadership in information systems management be placed in
> OST. It is further recommended that a new post of Assistant Director
> of OST for Information Systems Management be created, the incumbent
> also being designated as Special Assistant to the President for In-
> formation Systems Management.

Although the Assistant Director for Information Systems Management would operate under

the Presidential Science Advisor/Director of OST, Knox advised that there be no change

in the status of the OST "information" staff assistant in his dual role in handling

the COSATI chairmanship as well as the OST responsibility.

At first blush, it would appear that Knox was casting about for a higher and more in-

fluential role in the Executive Office of the President, and was willing to pass his

OST position to some other person. Having worked closely with Knox during this per-

iod, the author is convinced that the proposition that Knox was making was the re-

sult of his conviction that there was a tremendous vacuum that needed to be filled

and that the Federal government and the country would gain by creating such a post.

2.3.3

Knox was a gifted executive with a truly creative flair. He saw opportunities where others saw problems.   Had he had been given the opportunity to explore the potentials of the information pioneer in the Federal government back in 1966, there is no telling how much more we would be advanced today in the Federal, State and local government information management scene. On the other hand, the time was not ready for such a breakout, undoubtedly. It would have been hard for Don Hornig to sell such a new post, even if he was convinced of its merit; obtaining "spaces" for new people was becoming more and more difficult in the mid-1960s. In recogni- tion of the role that OMB is playing currently in the information management area, Knox' observation about putting the proposed program in BOB is fascinating, considering that it was made in 1966:

> The Bureau of the Budget has legislative authority to lead Federal agencies in improving managerial techniques, and exerts leadership through its Assistant Director for Management and Organization. Its actions in information systems management have been slow and limited. It has sponsored preliminary studies in foreign affairs information management and regulatory agency (ICC) information management. It has also recently set up a subordinate office to provide better coordination and leadership in ADP systems, which are analogous to (alt hough much simpler than) the information systems discussed here. The BOB also is charged, through its Assistant Director for Statistical Standards, with coordinating Federal agencies' statistical data systems. A current project is the evaluation of a proposal for a national data center for the social sciences (using outside consultants for the evaluation). A major disadvantage to putting this function in BOB is the pervasive image of BOB as being more interested in cost and manpower reduction than as a leader in technologically-based managerial innovations. It would also appear to be better management practice to place responsibility for information systems management innovation outside BOB, since BOB will sit in judgement on departmental and agency proposals in this field.

The insights expressed by Knox still appear to be relevant today.

In June of 1966, President Lyndon Johnson signed a letter which appeared in a new report prepared by a PSAC panel under the chairmanship of Philip Handler, then in the Department of Biochemistry, Duke University.[1] What the President said at that time is still being said today.

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[1] Handler, Philip, et al, Handling of Toxicological Information, A Report of the President's Science Advisory Committee, The White House, Washington, D.C., June 1966, 21 pages.

>The number of chemical compounds to which people become exposed is already vast and increasing daily. This is the result of our steadily advancing industrialization, changes in agricultural practices and advances in the biomedical sciences. All segments of our population are exposed either deliberately or in the course of daily living to many such compounds. Of particular importance are the effects of chemicals to which people may be exposed at low concentrations over prolonged periods, because in these cases the toxic effects may be subtle and difficult to discern. The Panel on the Handling of Toxicological Information has examined the ramifications of this complicated problem of industrialized societies and has made a humber of recommendations. Among these is the recommendation that there be established by the Department of Health, Education and Welfare, a computer-based facility to cope with the flood of toxicological information and to make it quickly available to people with a legitimate need for it. Because of the widespread interest in the subject matter of this report, I have directed that it be published and made generally available.

DHEW did give high priority to the Handler Report, establishing the computer-based toxicological information system at the National Library of Medicine under Dr. Henry Kissman, who continues to lead the program currently. The Panel also called for a stronger intraagency drug technical information system,   under the Food and Drug Administration, to be developed by an outside contractor on an urgent basis. Other recommendations called for the development of a vocabulary for toxicological information suitable for automated storage and retrival systems; endorsed the effort being undertaken jointly by the American Medical Association, the Food and Drug Administration and the Pharmceutical Manufacturers Association on reporting of adverse drug reactions; commended the efforts of FDA and the World Health Organization in establishing. a worldwide adverse drug reaction reporting system; and asked that to the extent possible proprietary drug reaction information be made available to the public.

Later, Philip Handler became the President of the National Academy of Sciences. While there, he showed little interest in scientific and technical information matters, but the accomplishment of the late Handler in the toxicological information area earlier, including his zeal in getting the Office of Science and Technology to implement the recommendations of his panel, turned out to be a solid contribution deserving special mention.

On the broader Federal information front, there was a request made by President Johnson in early 1966 to the leaders of the Executive Branch to explore every path to

provide the best possible service for our indvidual citizens and that "eventually

there should be a central information office in every major metropolitan area where

citizens could get information" about. Federal government programs. This is quoted

in a memorandum to the President from GSA proudly announcing that in cooperation with

the Bureau of the Budget and the Civil Service Commission a pilot Federal Information

Center would be opened in Atlanta, Georgia, on July 11, 1966. [1] With the passage of

time, GSA opened a string of information centers across the United States. Although

their existence is being threatened by funding cutbacks in the early 1980s, they have

been able to survive. The rationale stated for the first center by Moody was that

the center will answer many questions directly and a heavy workload of misdirected in-

quiries from the 70 Federal activities in the Atlanta would be reduced. The request

made by Johnson and the response by Acting Administrator Moody exemplify the climate

that existed during the Johnson Administration about the importance of information

delivery.

Returning to scientific and technical information, it was during the same time-frame

that Donald F. Hornig, Director of the Office of Science and Technology, testified

before the House Committee on Science and Astronautics on the proposed Standard Re-

ference Data Act. [2]   Extracts of what he said follow.

> Today's session is an opportunity for me to address a subject which is
> of national importance and very directly relevant to my job of coordin-
> ating Federal activities in science and technology and assuring that
> science and technology are used most effectively in the interests of the
> national welfare...With respect to the National Standard Reference Data
> System (NSRDS), in the course of research, development and testing,
> many measurements are made describing the properties of matter--the me-
> chanical properties of materials, the masses of atoms, the rates of chem-
> ical reactions, the wavelengths of light in emission spectra, etc. These
> measurements are then recorded and published in the scientific and tech-
> nical literature for other to use. (These data) must be collected and
> made available to the roughly two million scientists and engineers employ-
> ed in the R&D effort, who need ready access to this data in their day-to-

[1] Moody, J.E., Acting Administrator of General Services, Memorandum to the President, Establishment of First Federal Information Center, June 2, 1966. A footnote in Moody's memorandum cites 1 Weekly Comp. Pres. Docs., p.417 as source for the President's message to the Executive Branch.

[2] Hornig, Donald F., Director of the Office of Science & Technology, Testimony before the House Committee on Science & Astronautics on the Proposed Standard Reference Data Act (H.R. 15638), 28 June 1966, pp 9.

day work of research and designing components, selecting materials, and
building systems from space vehicles to oil refining. Failure to find
data which the user can trust results in either re-running experiments
to establish the data, overdesign of components, faulty and wasted pro-
ducts, or abandonment of the effort... The establishment of critical
tables is a long-standing national and indeed continuing international
effort...The methods of making such information readily available have
been overtaken and collapsed by the advance of technology itself. The
causes? the increased complexity of the field of science and technology;
the increased volume of scientific and technical information generated;
and the increase in volume and complexity of the use patterns of such
data... The preparation of standard reference data is no simple job; it
calls for scientific and engineering competence of the highest degree,
yet because this effortonly rarely leads to the discovery of new know-
ledge, there is a shortage of able scientists and engineers working in
this field...

The problem of standard reference data is part of the general question of
the network of information systems in the whole of science and technology.
The overall information problem has been a subject of considerable im-
portance in OST for several years. It is not a new activity so much as an
effort to get better organized and do a more effective job of information
transfer in both the public and private sectors...The National Standard
Reference Data System should be considered part of the total national net-
work of scientific and technical information systems.   ·

It should be mentioned that the testimony of Dr. Hornig and other eminent scientists

and engineers contributed to the decision of the House Science and Astronautics Com-

mittee and its counterpart in the Senate to pass the bill, which became the law when

it was signed by President Johnson.   Subsequently, the international CODATA program

was established, based on the model of the National Bureau of Standards' standard re-

ference data program.

Interest began to build in the science community in the development of national informa-

tion networks for science and technology as the Office of Science and Technology

explained its program to scientists and engineers in professional society meetings

and publications. There was a difference of opinion, however, as to what organization

should be responsible for such a system. For example, several physicists felt that if

such a program should come into being, it should be sponsored and operated by the

National Academy of Science and the National Academy of Engineering, although it

might be chartered by the Federal government with the cooperation of industry, pri-

vate foundations, technical societies, and be supported by public funds, supplemented

by direct usage charges. It was their belief that the institute established to

create and operate the center be responsible to the entire scientific and technical

community and not be dominated by any single agency. It was also the view of spokes-

men for this group that: [1]

> ...the primary effort of the Institute would be to unify the diverse
> aspects   of scientific knowledge and lead any seeker of knowledge
> from the natural world, through coordinate indexing, to the diverse
> scientific interpretations of that world...Brilliant interested young
> scientists will probably become the most fertile source of comprehensive
> descriptions of well-established scientific and technical knowledge, ra-
> ther than eminent scientists who have made their mark and spend much of
> their time in supervisory or administrative work.

Neal described how in the field of electromagnetic theory, the field in which he

operated, the program might work, a program which would bind individuals and organ-

izations together.   In Knox' response by telephone, he pointed out that Neal was

really advocating the "establishment of a mechanism for ensuring that critical re-

views in all areas of science and technology are prepared on a timely and authorita-

tive basis and that they be made readily available to all interested users in the forms

most useful to the users." Neal agreed, pointing out:

> The natural world is a single entity, and a central group such as that
> I propose is vitally needed to recover the unity of science and overcome
> the divisive tendencies of the strong, highly-financed investigations
> concentrating on narrow aspects of the natural world.

In seeking to stimulate a professional community to sponsor a central group, Neal

wrote:

> ...I believe that the task I propose cannot be accomplished by a central
> group of scientists and engineers participating on a spare-time basis
> or by a group of librarians. The central group or task force should be
> composed of full-time experience scientists and engineers.

He agreed with Knox that the feasibility of a central group was yet to be proved. He

subscribed to the view that:

> Even within a specific area, the mathematical models, the methods of anal-
> ysis and synthesis, and the scientific rules or laws should be described
> in proper perspective as blocks of a single body of well-established know-
> ledge, and not as isolated concepts. It is the redundancy and ambiguity
> of these so-called isolated concepts that case the present apparent but
> unrealistic profusion of scientific knowledge.

In his 5 Aug. 1966 letter to Knox, James P. Neal enclosed a short paper entitled

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[1] Neal , James P., Department of Electrical Engineering, University of Illinois,
Urbana, Illinois, correspondence with William T. Knox, Office of Science and
Technology, Washington, D.C., 6 February 1966, 22 February 1966, and August 5,
1966. pp 10.

"Knowledge-Processing" Versus "Information-Processing," in which he sought to dis-
tinguish the difference between them. He argued that information-processing involved
the processing of information in "least-size bits of information," whereas knowledge-
processing involved the communication of knowledge in blocks of various logical
sizes. It was his view that originators of knowledge would probably prefer that
each of their reports, papers, reviews, or books be treated as new items of knwoledge,
and be stored, cross-indexed, abstracted, referenced, and studied by every user of
knowledge having any degree of interest. He gave a colorful example of his thinking
in these words:

> Some compare the idea of a single knowledge reference system to mother-
> hood, presumably from the viewpoint that they are both wonderful concepts
> and cannot be criticized. The disparity of these concepts are more inter-
> esting. If motherhood is not limited by birth control the world can be
> flooded with people, while if a single knowledge reference system can be
> created through publication control, wherein the originators of new know-
> ledge deposit it properly oriented in a single universal knowledge re-
> ference system, the flood of new publications will not swamp our research
> efforts.

Even though there is no history of achievement of the Neal recommendation, it never-
theless was a heartening sign of interest during the period when it was not unfash-
ionable to recommend a national system approach. But it should be acknowledged that
it was a tiny splinter group of scientists who saw in the COSATI approach an oppor-
tunity to improve the way scientists and others communicated.

More successful in 1966 was the establishment of the Interuniversity Communications
Council (EDUCOM). In a letter to Hornig,[2] Knox explained that EDUCOM was formed as
the result of the initiatives of Professor James Miller, University of Michigan, and
seven medical school deans. It had grown to about 25 university members whose schools
included about 50 percent of the total enrolled students. EDUCOM, Knox reported,
had as its primary purpose the dissemination of reports on the state of information
techniques, and to establish task forces in areas of critical development, task forces
that were already working on the feasibility of nationwide networkds for transmission

[1] Neal, James P., "Knowledge-Processing" Versus "Information-Processing", 26 July
    1966, pp 5, unpublished)
[2] Knox, William T., Memorandum to Dr. Donald F. Hornig, Subject, Interuniversity
    Communications Council (EDUCOM), 4 March 1966, pp 2.

of educational data, the formulation of educational methods, and on the problems

posed for copyrights and patents by burgeoning technology. Knox expressed his view

that he was not at all sure that while EDUCOM had good backing from the medical

schools it was generally supported by the university administrators. He was also

impressed that EDUCOM intended to be a permanent organization. It had already been

financed by the Kellogg Foundation to the extent of $750,000 for a period of five

years. Hornig returned the Knox memorandum with a suggestion that Dr.John R. Pierce,

Executive Director, Research Communications Sciences Division, Bell Telephone Labor-

atories, Murray Hill, New Jersey, be asked to comment on the EDUCOM as he saw it.

Pierce responded that the task of demonstrating that good remote computer services

could be delivered was useful, but he was concerned that EDUCOM would try to do more

than it could successfully accomplish. He was hopeful that it would achieve this

goal with harassing others also trying to solve the problem of providing good comput-

ing services remotely in the field of education.[1] A week later, armed with Pierce's

reply, Knox wrote to Hornig, obviously disregarding Pierce's comments on EDUCOM, but

seeking to explain why he had brought up the subject of EDUCOM:[2]

> A specific problem area created by EDUCOM is the National Medical Library
> Study. EDUCOM was created by 7 medical school deans very interested in
> communications and medical library operations, and two of them, still prom-
> inent in EDUCOM, have severely criticized the medical library study (prepared by
> BOB-OST) because it does not include EDUCOM's plans in it.

Apparently, the concern voiced by Knox diminished. Several weeks later, Knox informed

Hornig that the National Library of Medicine is slowly being persuaded in the merit of

the OMB-OST sponsored study of a national medical library system.[3] Knox added, almost

gratuitously:

> Executive (Office) control over NLM is weak; Cummings (NLM director) is build-
> ing close ties with (Senators) Fogarty and :Hill. The National Library Commis-
> sion may help Executive control of NLM.

When Knox' successor took over his position, whatever difficulties Knox had encounter-

ed had apparently disappeared and relations between OST and NLM, if there ever had

[1] Pierce, R.A., Bell Laboratories, letter to Donald F. Hornig, March 22, 1966, 1 page
[2] Knox, William T. OST, Memorandum to Donald F. Hornig, 31 March 1966, 1 page
[3] Knox, William T. OST, Memorandum to Donald F. Hornig, 24 June 1966, 1 page

been any disagreements, were not in evidence. This changed state of affairs may have

been resolved even before Knox departed.   Part of the misunderstanding ¦may have

been the result of Knox' espousal of the concept of the National Library of Science

and Technology. This concept is described in an internal OST memorandum.[1] In creat-

ing a national STI network, additional libraries along the lines of the National

Library of Medicine and the National Agricultural Library would be needed in different

fields of science and technology. Rather than creating these libraries, Knox proposed

the establishment of a single National Library of Science and Technology (NLST) cov-

ering all fields of science and technology exclusive of medicine and agriculture.

Various libraries would have holdings that would be, in aggregation, the NLST; for

example the Department of Interior Library would be a subcomponent of NLST for geo-

logy. Knox thought that NLST should be located at the National Bureau of Standards,

rejecting the possibility that Smithsonian Institution be the locus. NLST would have

the national responsibility for acquiring, accessioning, and providing bibliographic

control of worldwide significant publications in its areas of science and technology.

Mission-oriented agencies would oversee NLST to insure that its services were ade-

quate to their needs. Maintenance of individual National Inventories of Serials in

subject areas would be the responsibility of NLST.   The components of NLST would be

the Division of Science and Technology and the National Referral Center for Science

and Technology, both would have to be transferred from the Library of Congress, the

Science Information Exchange (domiciled in the Smithsonian Institution), the Clear-

inghouse for Federal Scientific and Technical Information (now the National Technical

Information Service), and the Federal Translation Service (Joint Publications Research

Service).   The last paragraph of the memorandum called for the location of the li-

brary to be in Chicago or St. Louis with the former being Knox's choice because of

"a more numerous Illinois Congressional delegation." This choice was a surprise to the

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[1] Knox, William T. Memorandum to Dr. Colin M. MacLeod, Deputy Director, Office of
      Science and Technology, Subject: National Library of Science and Technology,
      21 January 1966, pp 3.

members of COSATI, since it had not been discussed even as a possibility that NLST

would be located outside of the Washington, D.C. area. Obviously, Knox' suggestion

had been influenced by his discussions with Congressman Roman Pucinski described

earlier in this book. As part of the overall library proposal, Knox called for the

establishment of a National Library Council. In his 24 June 1966 memorandum to Dr.

Hornig, he suggested that there be a Presidential announcement of a National Library

Commission, because "outside pressures and proposals for such are increasing (and) the

President should lead." Knox suggested the date of September 1, 1966 for the Presi-

dential statement, which Hornig found acceptable.   The announcement was not made,

nor did the proposal for a National Library for Science and Technlogy receive favorable

action.   The lack of affirmative action did not presage a drop in Hornig's interest in STI.

Hornig made his support for a strong national standard reference data system clear and

unequivocal in testimony before the House Committee on Science and Astronautics.[1] His testi-

mony started out with a ringing statement:

> Today's session is an opportunity for me to address a subject which is of
> national importance and very directly relevant to my job of coordinating
> Federal activities in science and technology and assuring that science and
> technology are used most effectively in the interests of the national wel-
> fare.

He stated that he would   address the National Standard Reference Data System and its

relationship to the total national scientific and technical information program. Some

of his comments are presented:

> What is standard reference data? In the course of research, development,
> and testing, many measurements are made -- the mechanical properties of
> materials, the masses of atoms, the rates of chemical reactions, the wave
> lengths of light in emission spectra, and many others. These measurements
> are then recorded and published in the scientific and technical literature
> for others to use. It is essential for the efficient conduct of the na-
> tional research and development program that measurements of this sort,
> published in widely separated places, be collected and made available to
> the roughly two million scientists and engineers employed in the research
> and development effort...
>
> Why do we need a National Standard Reference Data Program under the manage-
> ment of the National Bureau of Standards? The primary reason is that no

[1] Hornig, Donald F., Testimony before the Committee on Science and Astronautics, House
of Representatives,on the Proposed Standard Reference Data Act (H.R.15638), 28 June
1966, pp 9.

one group has undertaken to assess the total standard reference data needs
of the national research and development community and to ensure that needs
are being met...The methods of making such information readily available
have been overtaken and collapsed by the advance of technology itself. This
the result of the increased complexity of the field of science and technol-
ogy, the increased volume of STI generated, and the increase in volume and
complexity of the use patterns of such data. We are dealing not with a brand
new subject but rather with an aggravated situation of fragmented dispersed
effort and antiquation of methods. The task is to organize disparate efforts
and apply modern techniques to an existing activity which is not being done
well.

Hornig pointed out that the preparation of standard reference data is no simple job.

An exhaustive study of the literature must be made. Where unpublished data exist,evalu-

ators must work hard to get them. The various numbers for a given measurement must be

weighed against each other and a decision made as to the possible best number and its

probable accuracy. Because effort of this type rarely leads to the discovery of new

knowledge, there is a shortage of able scientists and engineers working in this field.

Ample funds for standard reference data program should be provided, it being a very

small part of the cost of research and development.

Referring to the general question of the network of information systems in the whole of

science and technology, Hornig stated that the overall information problem has been a

subject of considerable importance in the Office of Science and Technology for several

years, because of the increase in the volume of information being generated, the in-

creasing number of scientsts and engineers, the complex use of information for purposes

far beyond those in the mind of the original investigator, and the mounting costs of

information generation and processing. He pointed out that:

The assurance of continued progress is dependent upon our ability to keep
informed of past progress in terms of both successful and unsuccessful re-
sults and the ability to transfer results from one area of effort to other
areas of effort. So we build information systems. National information
systems constitutes not a new activity so much as an effort to get better
organized and do a more effective job of information transfer in both
the public and private sectors.

As a result of his and the testimony of others, equally supportive of the National Stand-

ard Reference Data System bill before Congress, it was passed and became the law. The

program still continues, but the kind of funding that Hornig pointed out would be

needed is now being curtailed. Even more unfortunately, the kind of logic that called

for a national STI system approach found few supporters in and out of the government.

With the passage of time, even the notion of a national integrated STI system was for-
gotten. There is a reasonable belief that if more support and effort had gone into
this program on the part of subsequent Presidential Science Advisors to Hornig, there
would have been further strengthening of the Federal and national science and technol-
ogy effort over the years.

Despite the formidable effort of the COSATI community, it was inevitable that there would be
disagreements about its operation and scope of activities. This was expected for
several reasons. First, to the extent that COSATI flourished, there was a continuing
oversight by a higher headquarters closely associated with the Office of Management and
Budget, thus some diminishment of degrees of freedom. Second, the more vigorous the
COSATI endeavor, the more time was required of the top STI managers of the agencies to
achieve the goals of the specific COSATI programs. Third, The Federal R&D agencies
were expected to provide funds for COSATI programs, especially in undertaking studies
and surveys.   STI managers did not control funding in all of the agencies, thus
had to "battle" for funds for COSATI purposes. The Federal agencies all had different
missions, hence regarded their STI programs through different lenses. To obtain the
views of the agencies, during a meeting of COSATI, Chairman Knox asked the COSATI members
for their analysis of the effectiveness of the COSATI panel structure.[1] The responses
came in by memorandum or telephonically. A few of the comments are summarized:

> Melvin S. Day, NASA: The use of permanent panels in specific subject areas
> of common concern is effective, and is really about the only way to get the
> job done. Using COSATI as a whole for a working group would not be feasible.
> There is some danger, however, that we may get too many panels operating, not
> that the problem areas don't warrant panels. Operating agencies have a limit
> to the number of manhours they can devote to non-operating activities, no matt-
> er how important, even the large ones. Don't expect much speed from panels. The
> members have other duties, hence cannot spend as much time on panel business
> as might be desirable...

> Edwin M. Weiss, Department of Interior: The panel structure is the best technique
> that COSATI can use, allowing it, as an interagency committee, to draw upon the

[1] Aines, Andrew A., Memorandum for the Record, 11 August 1966. 1 page.

2.3.3

> the present panel's assignments are too large and amorphous for them to be effective. My own preference is for the employment of a few individuals working on specific and important problems. We have seen this in descriptive catalogs, microfiche cards, and in guidelines to distribution of magnetic tapes to other countries. There has been some useful interchange of ideas and information in the panels as well in COSATI...

On the whole, the responses were favorable to COSATI - how it was organized and how it functioned. Some of the respondents - the most active ones - were legitably concerned that COSATI was competing for their most competent and productive people. While there were some kudos coming to agency STI heads for their cooperation with COSATI, they were legitimately concerned with their achievements within their agencies. No additional spaces were being made available for external purposes. The burden became even heavier when COSATI undertook projects and tasks that when completed would be of little help to them. Yet, there was full understanding that what COSATI was seeking to accomplish was in the interest of the R&D agencies and the STI programs. Invariably, the efforts of COSATI raised the general level of acceptance of the agency STI program within each agency, brought the managers of agency R&D programs and agency STI programs closer together, and provided for all agencies a recognition of challenges and the need for high quality STI programs. Had not the COSATI program blossomed, it is dubious if the challenge for improved agency STI programs   that was so apparent in the 1960s would have been answered so effectively. There is nothing as tonic as competition between and among the agencies to stimulate action of a productive nature.

In the last couple of years, there has been an organized government effort to reduce or eliminate the flow of scientific and technical data to countries hostile to the interests of the United States. The protection of U.S. "know how" reached a "flash point" when the guardians of free flow of scientific and technical information - the National Academies, the American Association for the Advancement of Science, the universities, and other groups - combined to make this a national debate. In this connection, it is interesting to read a note made by William Knox to the Science Advisor.[1]

[1] Knox, William T., Memorandum for the Record, Office of Science and Technology, 27 July 1966. pp2.

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> I reminded Dr. Hornig of the binge DDR&E (Director, Defense Research and Engineering) is on regarding restricting the release of scientific and technical information. Listings of unclassified research projects have been withdrawn from the Science Information Exchange, new regulations have been issued regarding presentation of unclassified research papers of international meetings, and DOD is looking again at the Commerce Clearinghouse distribution of Defense-sponsored unclassified reports. Dr. Hornig agreed that it was time to discuss the matter with John Foster (DDR&E).

With the passage of time, the Department of Defense ameliorated its rigid position and the information flowed through normal channels. But it does reveal the "cyclical" nature of DOD apprehension about the unwanted loss of technical information and, in a sense, the difficulty of retaining strict control of outflow in a democracy. This episode, related to what is happening currently, should clearly reveal that STI has and will always be sensitive to international events and climate. The matter was thoroughly discussed by the COSATI Panel on International Activities and resulted in the preparation of a policy paper. This is mentioned because the disappearance of COSATI and its function for more than a decade drew a veil over the work undertaken in 1966 to establish a policy on international information interchange.

On the same memorandum for the record, dated 27 July 1966, is another interesting matter discussed by Knox with Hornig:

> I reported on conversations with Phil Yeager of the Daddario Committee staff in which Yeager had indicated considerable interest in having hearings sometime next spring on the developing national systems in scientific and technical information. Hornig was emphatic that the President should keep the iniative in the development of national systems, and that it would be desirable that congressional hearings be postponed until a specific plan had been submitted by the President. At that time, of course, congressional hearings would be welcomed...

It was obvious at that time that both Hornig and Knox had expectations of success in furthering the national information systems approach. Quite possibly, if Hornig agreed to the involvement of the House Science and Astronautics Committee, the project may have fallen through and the hearings would not have materialized. On the other hand, the stimulation that might have followed hearings undertaken by the Daddario Subcommittee might have solidified consensus for a national system in scientific and technical information. The Bureau of the Budget might have been able to find the spaces and funds that OST needed to launch the program if the base of sup-

port was made available to the Office of Science and Technology. Was this an opportunity lost that if exploited would have made a difference? We can only conjecture. on what might have happened.

During the 1960s, the major Federal agencies involved in research and development, the Department of Defense, NASA, NSF and others, were providing a generous allotment of funds for research into information processes. Projects MAC and INTREX were undertaken at the Massachusetts Institute for Technology, for example,to determine how new information technology could be used to improve and extend the handling and delivery of information. Dr. Robert Fano, MIT, director of Project MAC explained what he was doing along these lines: [1]

> Project MAC provides a discourse between men and computer through a simultaneous multiple access tool, using the computer to allow a number of people to interact with each other, unaided and in real time from remote locations. User browsing capability as well as instantaneous availability are built in.

Anticipating what is common practice today, Fano demonstrated how a user could help modify a document in a file belonging to another author and how the first author could be informed of the action. Fano pointed out the time value of certain kinds of information by telling how Jerry Wiesner, the President's Science Advisor, was disappointed in an experiment dealing with the analysis of data resulting from a nuclear explosion in space. A new Van Allen belt was postulated and the explosion was supposed to demonstrate it. Unfortunately, the lack of speed in processing the data made it difficult for him to make an immediate announcement of results. Fano expressed his appreciation that DOD's Advanced Research Project Agency (DARPA) was providing needed R&D funds to make Projects MAC and INTREX possible. Dr. Robert Overhage, who was the project director of INTREX, which was more focused on library automation, stated that NSF had provided about $620,000 over a two-year period for his project. Both directors st ated that they were having difficulty in obtaining more funds for operations of the two systems. This aside, it is obvious that the Federal funding played a key role in

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[1] Aines, Andrew A., Office of Science and Technology, Memorandum for the Record, Subject: Report of Visits to Projects MAC and INTREX, MIT, Cambridge, Mass., 21 and 22 July 1966, pp 3.

these two seminal projects. It also illustrates the close relationship that the

Federal R&D agencies (and the Office of Science and Technology) had with the uni-

versity during these pioneering days. With the exception of the reduced support

that NSF's Division of Information Sciences provides universities currently, little

is left of the close and symbiotic relationship between the government and informa-

tion scientists that existed during the 1960s and early 1970s. It woud be useful,

from an historical standpoint, to review what progress resulted from the government-

supported research in the state of information processes that we are enjoying today.

 Evidence of the ferment for improved information systems was seen, during this per-

iod, in the engineering community. A committee called the Tripartite Committee was es-

tablished by the Boards of the Engineering Index, The Engineers Joint Council, and the

United Engineering Trustees "to develop and bring into being a United Engineering In-

formation System and Center." [1]   The framers of the Report wrote:

> ...(T)he entire field of information analysis and development of new
> services is being given intensive study today by many groups in the
> United States. Insofar as the Government is concerned, the Federal Coun-
> cil for Science and Technology (through its Committee on Scientific and
> Technical Information) Has already determined that a system shall be
> created that will assure the availability in the United States of all
> relevant, important scientific and engineering documents for the use of
> scientists and engineers....Also the National Academy of Sciences and the
> National Academy of Engineering have appointed a joint committee, funded
> by the National Science Foundation, to examine the information programs
> of organizations dealing with the various fields of science and engineer-
> ing.

The Report described a meeting of the three engineering organizations to discuss the

above and their own information programs. They concluded that there was a need to de-

termine whether or not there should be a single United Engineering Information System

and if the answer was in the affirmative, to recommend what actions were needed to

create such a system. The chairman of the Tripartite Committee was Walter Lobo and

the secretary was one of the leading information specialists in the country, Ben Weil.

[1] Phelps, Ralph H., Weil, Ben H. (Engineering Index); Linder, Clarence J., Harris,
     William J., Jr. (Engineers Joint Council); and Lobo, Walter E., Genereaux, Ray-
     mond P. (United Engineering Trustees), Progress Report of the Tripartite Committee,
     July 7, 1966, pp 4.

A few weeks later, Weil made a presentation to a group of engineering officials in Boston, Mass..[1] He referred to several studies being undertaken in the use of engineering information. He acknowledged that considerable more attention was being given to the area by engineering organizations. The needs of engineers were not being served in the total information programs that were centered in the publishing of professional papers. There was a need for improved organization of the related work of all engineers and to be concerned with costs and duplication of research. Sharing publication costs was becoming more important a more expensive information tools were brought into common use. There was a new recognition that the institutions in which the engineers worked would have to pick up part of the bill. There had to be a new concern about the deeper involvement of the Federal government as it sought to create a "national system" approach and take over more of the funding burden. It was necessary for the engineers to run as much of their own system as possible. He concluded his remarks with the following statement:

> Technical information is the common denominator for the scientific and engineering societies. The breakdown of barriers between disciplines has rendered this truer than ever before. We have many problems ahead; copyright, better systems, compatibility, development of increased network central action, industry-Government cooperation, etc.---but they are not insurmountable. Ten years fron now, certainly, a far different paper will be possible on "Trends in Engineering Information Use."

That Weil was wrestling with the notion of deeper Federal involvement in engineering information systems became even more evident in a letter to the Editor of Chemical and Engineering News.[2] He stated that Dr. Robert W.Cairns, chairman of NAS-NAE's SATCOM (also a director of the American Chemical Society) reported that a SATCOM opinion was that in developing a national ST system "the major responsibility for leadership must lie with the (Federal) Office of Science and Technology, and any national system would have to rely heavily on government resources." Weil compared the chem-

[1] Weil, Ben H., Trends in Engineering Information Use, a talk given before the Council of Engineering and Scientific Society Secretaries, Boston, Mass., July 27, 1966, pp 5

[2] Weil, Ben H., Letter to the Editor of Chemical and Engineering News, on Federal Information Leadership, August 4, 1966, pp 2.

ical and engineering information programs and climate and concluded with these remarks:

> Federal leadership in the chemical-information area may be the only way. Certainly, the Federal studies of the past few years have been vital and sharp. But the chmical industry has not been asked if it would prefer to "do it for itself." Unlike for engineering, no determinative study is being made. Should not someone find out if the chemical industry will pay the bill for the National (no one calls it Federal) Chemical Information System?

In a further exchange of views between Knox (OST) and Weil, it became very clear that Weil was not taking an anti-Federal stance; his very understandable concern was that the industry, if it considered itself solvent, should do everything it could to run its own information affairs. There is no arguing with the legitimacy of this point-of-view. As a matter of fact, the manner in which the Federal government has undercut its own STI programs in recent years makes the Weil argument even stronger. If the OST-led national system for scientific and technical information had come into being during the 1960s, its collapse in later years might have been calamitous, a blow to national pride and U.S. science and technology. This observation is made because of the termination of the Office of Science and Technology in 1973. It is doubtful that the program could have continued at the Federal agency level and without the direct involvement of the President's science advisor.

Returning to the events of 1966, there were other repercussions from the thinking that OST was doing about the national information system. One of these dealt with the status of individual Federal agency STI programs in light of developments in the last few years. COSATI was steadfast in its view that what was needed was not a national or Federal STI uni-system, but an integrated, coordinated network of individual systems, each operating at a high level of efficiency, but designed to be compatible in terms of information flow and uniform standards.

It was acknowledged that the pace setter among Federal agencies in science and technology was the Department of Defense, thus it was important

that DOD have a well planned, well executed, effective and efficient information system. Since DOD generated information of use to other agencies and used information generated by them in return, it was decided that there was need for a review of the DOD STI program within the context of the Federal structure. Nearly four years had elapsed since the last major review of the DOD program. Communications and information storage and retrieval technologies had advanced considerably during that period and new information transfer techniques had emerged. A draft review plan was prepared and discussed with the Director, OST, and Dr. Donald M. MacArthur, Deputy Director of Defense Research and Engineering (Research and Technology) and Walter Carlson, Director of Defense Technical Information. [1] By agreement, the study was to be undertaken by DOD, not an outside group. A few statements in the plan are excerpted:

> From a functional point of view, there appears to be a requirement to examine two aspects --one, an evaluation of the component stinfo activities, and two, an evaluation of the total stinfo activities as an integrated system. There is ample evidence that the three military services do not feel they are participating in a DOD-wide stinfo system, although they might be performing their own functions adequately.

> From an organizational point of view, there should be some top level expressions of interest in getting a thorough, competent review. Perhaps the Secretary of Defense will wish to localize responsibility within DDR&E. On the other hand, the ASD/Systems Analysis, ASD/I&L, and ASD/Intelligence play an important role in the total DOD information transfer network, anc could probably add considerably to the value of a DOD-wide review.
> (Author's note: At the time the review was being discussed, the Director of DOD Technical Information was responsible for the implementation of DOD Directives that gave him responsibility for technical information activities and coordination of the DOD logistics and intelligence information programs that genated technical information.)

> Questions to be Asked in the Review

> 1. In what respects is and is not the stinfo activity serving

[1] Knox, William T., _Review of DOD Scientific and Technical Activities_, Office of Science and Technology, Washington, D.C. Contributions to the plan were made by Curtis L. Fritz. 17 August 1966, pp 5.

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the defense mission? By what means is it related to the defense mission? If not, why not?

2. Is there adequate long-range planning? Is there a 5-year PPB (planning, programming and budgeting) for the program? Do the services have one? If not, why not?

3. What would be the shape of an integrated DOD STI system in functional and organizational terms?

4. What information activities should be excluded: Why: Is research project reporting a part of the program? What is the future of the activity? Similarly for information analysis centers.

5. What would be the benefits and costs of an integrated operating system; what is the comparable present cost?....

13. How does the program fit with the information programs in other covernment departments, OST, industry, Congress, the R&D community, and academic sectors? How does the DOD program look from their viewpoints?

14. How does the program compare with that of other countries?

15. What are the managerial, personnel, skills, and technology deficiencies? What is being done to overcome these deficiencies?

Since this chapter is focused on OST and COSATI, rather than individual

Federal agency programs, little else will be said about the outcome of

the project at this point. The inner workings of the Office of Science

and Technology and its evident concern for performance of the Federal

agencies are what is being shown. The kinds of questions to be answer-

ed in the survey still remain the questions that need to be answered

today. Then as now, the DOD had the largest R&D program in being. It

was OST's belief that a major study of this agency's STI programs and

performance would be valuable to all of the other Federal agencies with

STI programs.

In October 1961, The Federal Council for Science and Technology adopted

a government-wide policy on page charges for publication of research re-

sults in scientific journals. In substance, the policy authorized Fed-

eral agencies to budget for and pay page charges as a necessary part of

research costs under Federal grants and contracts. There were two meth-

ods of disseminating the results of government supported R&D. The first

was by means of Federal agency STI dissemination of the results of work
undertaken in its own laboratories or through contractors in the form
of technical reports, usually unrefereed. The second was Government-
sponsored research frequently published in journals published by non-
profit organizations. The PSAC (Weinberg) and the NAS-NAE SATCOM Re-
ports gave their blessings to the page charge convention, arguing, in
substance, that the rate of scientific advance is determined in a sig-
nificant measure by the speed and effectiveness with which research
findings are disseminated among scientists who can use them in further
research, an integral part of the R&D process. With the shift from
small to big science in the post-World War II period, it was very evi-
dent that professional societies that were in the business of profession-
al journal publishing were unequal to the task of supporting the con-
siderable proliferation of submitted articles from scientists for eco-
nomic reasons. At the time the policy was enacted, there were about
25 journals that assessed page charges. The American Institute of Phys-
ics were the pioneers in this area. In 1966, the number swelled to about
100 journals of an eligible 300 or 400 that were eligible. The increase
was discussed by the members of COSATI, who were concerned with the
rapid increase in costs. They also wanted to know how sucessful the page
charge program was after a period of five years. On 27 July 1966, the
members of COSATI discussed and voted for a study of page charges. NSF
was asked and agreed to contract the study out. The objective of the
study was: [1]

> to provide the Government and the scientific community with
> a factual report on the status and problems of page charge
> application and an assessment of the practice as it has (or
> has not) contributed to increased effectiveness, of the
> dissemination of the results of Federally sponsored research.
> In the light of five years of practical experience, the page
> charge concept needs re-examination. Agency and journal
> policies that have developed around the initial ground rules
> require evaluation, and changes (if needed) in the overall
> policy must be elucidated...

[1] Korotkin L. Arthur, National Science Foundation, Memorandum to COSATI

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While the page charge convention was being examined, an issue dealing
with publication charges or free dissemination of Federally generated
STI arose. Arrayed as protagonist and antagonist were Ezra Glaser, an
information manager at the National Institutes of Health and William
T. Knox, OST. Glaser was the advocate for no subscription charges for
NIH publications. Knox views were colored by BOB Circular No. A-25 on
User Charges and a House of Representatives Report No. 1836, dated
August 11, 1966, issued by the Committee on Science and Astronautics,
which dwells on the arguments for free distribution of standard refer-
ence data, published by the National Bureau of Standards, which ccon-
cluded that partial cost recovery for government publications in this
area were worthwhile. Glaser sent a memorandum to Ralph Mueller in BOB
with his arguments from free dissemination.[1] He referred to BOB Circular
No. 25 (User Charges) and an OST guidance paper calling on Government
agencies to charge for its publications. Knox also addressed a mem-
orandum to Mueller in reaction to the Glaser paper.[2] Some of his comments
deserve mention because the problem will never be satisfactorily
solved and will be re-addressed every few years. Knox pointed out:

> We should bury once and for all the idea that publications
> charges are recommended by this office in order to return
> some money to the Treasury. While this will happen as a re-
> sult of user charges, it should be viewed as a non-avoidable
> side effect. The primary reason for instituting user charges
> for government publication is as a management control.

After lambasting some of Glaser's reasoning, including the view that one
reason for the program is to force some type of information on the atten-
tion of a particular target group, Knox states.

In an age of information surfeit, information cannot be forced

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1 Glaser, Ezra, National Institutes of Health, Memorandum Subject:
   Charges-for-Publications of NIH, to Ralph Mueller, Bureau of the
   Budget, Washington, D.C. August 19, 1966, pp 3.
2 Knox, William T. Memorandum to Ralph Mueller, BOB, Subject: Charges
   for Publications of NIH, 26 August 1966, pp 2.

on the attention of anyone, not even by the Federal government. The imposition of user charges is intended to awaken mature people to their individual responsibilities to be as selective as possible in getting information most pertinent to their needs. The solution of the problem is definitely not one of broadcasting documents free.

One of the benefits of maintaining a strong STI program at the OST level was the opportunity that the STI managers had to interact with other OST members, who were involved with a wide spectrum of scientific and technical information matters, and to offer advice and guidance leading to better STI programs in many areas. For example, one of the OST staff worked with the President's Commission on the Patent System. The ensuing report had a section on documentation. Given an opportunity to react to the draft report, Knox wrote: [1]

> I vigorously dissent with the recommendation that "The Patent Office should lay plans in the immediate future for attaining completion of search file conversion to microfilm form... Placing images of patent documents on aperture cards for reproduction and search purposes within the Patent Office and patent offices in large firms may be completely acceptable. But reproducing the published literature (excluding patents) in aperture card microform would be expensive and ineffective. The use of aperture cards for storing large quantities (one million or more items) of documentary material has been tried for ten years within the U.S. intelligence community. Newer techniques for searching microfilm images are required if a meaningful search of the file is to be made. Possibly more important is the near term availability of indexes to the world's published literature on magnetic tape...More efficient and effective computer-based systems will be available within a few years.

On another occasion, a report on reducing flood losses was released by the President.[2] Dean Peterson, OST's water resources expert, described the contents of the report including several information and data dissemination and management actions called for by an interagency task force. Peterson, along with other OST technical assistants, had been acculturated to the need for specific information recommendations by his OST STI colleagues, by their communities. The absence of science communica-

[1] Knox, William T.,Memorandum to David Z. Beckler, OST, Subject: Recommendations to the President's Commission on the Patent System, 15 August 1966, pp 2.

[2] Peterson, Dean F., OST, Memorandum to Donald F. Hornig, OST, Subject: Comments on 'A Unified National Program for Managing Flood Losses, August 10, 1966, pp 2

tions experts in the present Office of Science and Technology Policy has diminished such valuable interaction.

Not only did the OST staff solicit the views of their science communications associates, there was a steady stream of letters from all sectors to OST asking for advice, assistance, visits to their programs, and, on occasion, offering advice. One such letter came from State Technical Services Regional Technical Information Center at Southern Methodist University, Dallas, Texas, explaining what the Center was doing and advocating a network of "national information centers connected with a network of regional information centers designed to serve the local community and providing access to the multiplicity of specialized information centers and services developing across: the country." [1] In his response Knox pointed out; [2]

> ...While I firmly believe that direct access to large computers will be a normal ingredient of daily living by 1980, there are still many steps that have to be taken to realize this. Some of the schemes being talked about for the immediate future seem to have forgotten the need for small scale experimentation. Rather they envision large on-line networks connected to a huge central computer to be placed in operation within the next year or two. This course, I am convinced is dangerous and much too expensive for the benefits which will be achieved...

Almost two decades have passed since this interchange between Duggan and Knox. Her expectation of on-line networks girding the country have only been partially realized, while Knox' call for small scale experimentation materialized only in part. Certainly, in more recent years, there has been a visible lack of policy advocating almost any kind of experimentation in the development of new Federal databases and networks for science and technology. With the drive for cutbacks in the Federal government in recent years and because of the lack of better Federal STI

[1] Duggan, Maryann, Director, Industrial Information Services, Southern Methodist University, Dallas, Texas, Letter to William T. Knox, OST, August 10, 1966, pp 2.

[2] Knox, William T., OST, Letter to Miss Maryann Duggan, Southern Methodist University, 22 August 1966, 1 page.

program advocates in positions of power, little hope for progress should be expected.

While Knox was driving hard for more rapid implementation of the national information concept approved by FCST, there was still considerable difficulty in determining the precise role the Federal government should have in the "bankrolling" of information services. This was seen in an exchange between the Director of the National Library of Medicine, Dr. Martin M. Cummings and Knox.

On August 22, 1966, Cummings sent a letter to Knox with an inclosure of the conclusions of a study on medical library resources of the Greater New York area, underaken by Lee Ash and Vernon Bruette, under the auspices of the New York Academy of Medicine, New York City. Cummings wrote: [1]

> The heavy uses made of free-standing libraries for private commercial interests, reaffirms the findings which we made by studying data from the Library of the College of Physicians of Philadelphia. In my view, the New York study provides firm information which supports the concept of need for regional medical library services rather than the need for regional repositories or warehouses such as proposed by Herner in his network plan...The data clearly show that the costs for providing inter-library loan services are much higher than previously recognized and that no local institution can bear the burden of providing such serices without some form of outside assistance.

In his response, Knox agreed with the need for regional medical library services as opposed to regional warehouses. He then wrote: [2]

> It was rather disquieting to note the emphasis placed by the study on additional governmental subsidies as the preferred remedy, whereas the use of direct charges for special services rendered by these firms (commercial firms making disproportionate use on non-profit libraries) was implied to be used only as a last resource. My recommendation would be to proceed in the opposite direction--namely, to use special charges for services to commercial firms as the first step, charges that should cover full costs, including library improvement...Libraries have been wedded to the idea that they must provide a free service

[1] Cummings, Martin M., Director, National Library of Medicine, Letter to William T. Knox, Office of Science and Technology, August 22, 1966, 1 page.

[2] Knox, William T., OST, Letter to Martin M. Cummings, Director, NLM, 25 August 1966, pp 2.

> that it is almost impossible for them to consider charging for
> their services. Yet I am convinced that it is only by the in-
> stallation of appropriate user charges that we have any hope
> of achieving a rational allocation of resources to libraries
> and among libraries. I further believe that if and when lib-
> raries begin to charge business interests the full price of
> special services requested, these interests will find it to
> their economic advantage to purchase more copies of current
> journals and monographs. They may also find it more economic to
> have a more adequate library on their own premises...

Interestingly, Cummings was more concerned with the need for regional
library services, as contrasted to the need for regional repositories,
in his letter. Knox, on the other hand, took advantage of the inter-
change to further his views that were consonant with what he perceived
was the guidance in BOB Circular 25 and a House Science and Astronautics
Committee recommendation, referred to in his disagreement with Ezra
Glaser, National Institutes of Health, earlier. While there was some
merit in Knox's views about commercial users paying for information ser-
vices, he failed to mention that the OMB guidance did not extend to
users in cities and states. The argument that commercial users might
find it more economic to establish their own libraries was superfluous,
of course. Left out of the interchange were concerns with us
to this day: How do we serve the needs of users who have paid for the
generation of information by the Federal government through their taxes?
How do we serve the information needs of prospective users who for eco-
nomic and other reasons do not have access to electronic data bases
that increasingly become the preferred delivery system for STI? Un-
fortunately, a mechanism to establish such a policy at the highest level
of government does not exist, despite the need.

Throughout his first term, President Lyndon B. Johnson, continued to
show interest in library, information and educational matters. Early
in September 1966, he issued an Executive Order creating the National
Advisory Commission on Libraries, composed of distinguished citizens and

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experts. [1] The President said:

> The nation is providing better education to more citizens today
> than ever before. The result of this expanded effort in educa-
> tion is a rising demand for information -- and a tidal vave of
> new information touching every aspect of our lives: health, edu-
> cation, jobs, national defense, goods and services, transporta-
> tion, communications and environmental uses. But merely piling
> up valuable new knowledge is not enough; we must apply that
> knowledge to bettering our lives. In our effort to do this, we
> depend heavily upon the nation's libraries. For this reason,
> the Federal government will spend, next year, more than $600
> million in the library field. But money alone cannot do the
> job. We need intelligent plannning and advice to se that our
> millions are spent well. We need to ask: what part can librar-
> ies play in the development of our communications and informa-
> tion exchange networks? Are our Federal efforts to assist li-
> braries intelligently administered, or are they too fragmented
> among separate programs and agencies: Are we getting the most
> benefit for the taxpayers dollars spent? I have asked the Commi-
> ssion to appraise the role and adequacy of our libraries, now
> and in the future, as sources of scholarly research, as centers
> for the distribution of knowledge, and as links in our nation's
> rapidly evolving communications networks. I have also asked the
> Commission to evaluate policies, programs, and practices of
> public agencies and private organizations -- and to recommend
> actions which might be taken by public and private groups to
> ensure an effective, efficient library system for the Nation.

The Commission Chairman was Dr. Douglas Knight, president of Duke Univer-

sity in Durham, N.C. One of the most important products of the Commis-

sion was a recomendation for a permanent Federal group to oversee the

development and health of libraries in the public and private sectors.

Thus was the U.S. National Commission on Libraries and Information Sci-

ence born a few years later.

It is inevitable in the affairs of government that problems and issues

keep reappearing, recycling themselves every few years, seemingly - for

many of them - to be unsolvable. One of these, previously discussed, is

the "fee" versus "free" issue. It was the policy, bolstered by the

Weinberg (PSAC) Report of 1963, that since scientific and technical in-

[1] Office of the White House Press Secretary, Statement of the President
(Lyndon B. Johnson) and Executive Order: Establishing the President's
Committee on Libraries and the National Advisory Commission on Li-
braries, September 2, 1966, pp 5.

formation, generated during and as a product of Federal R&D,   ought
to be disseminated widely and at only the cost of dissemination. STI
costs were legitimately part of the cost of R&D which was supported by
the taxpayers, hence charging them for the information amounted to a
dual charge. Moreover, the value of the STI was enhanced if the in-
formational materials were rapidly and vigorously disseminated. The
charges should be nominal, enough to reduce the number of "nuisance" re-
quests from the public, but not enough to become too expensive to the
average user. Although there were a few commercial publishers and vend-
ors in existence during the 1960s, their number was small and their anx-
iety low. It was also the view of most of the COSATI members that the
amount of sales revenue to be obtained was extremely small, almost in-
finitessimal compared to the cost of the R&D that produced it. While
the Federal information managers were knowledgeable about BOB Circular
Number 25, none of them were aware that it applied to the dissemina-
tion of STI materials, since A-25 referred to special user services,
and there was nothing special about the STI materials.

Nonetheless, there was presidential and congressional pressure to re-
duce "free" services, not strong pressure in the R&D field, even from
BOB, but some pressure. Circular A-25, which came out originally in 1959,
was amended in 1963. It told agency how to cost public services and to
report charges made. COSATI panel and task group chairmen were urged
to consider the "fee" versus "free" problem and make recommendations.
They were also asked to obtain needed data, such as: Does your agency
provide STI to users without charge? If so, to what extent? If you make
charges, what are these and on what basis do you determine what the
charges should be? Has your agency   been preparing the annual reports
required by OMB Circular A-25? [1]

[1] Aines, Andrew A., OST, Internal Memorandum to William T. Knox, OST,
    User Charges, 28 September 1966, 1 page.

In keeping with the philosophy and practices of the Office of Science and Technology, it was understood by all of the technical assistants that they should be prepared to make contributions even in areas, general and specific, outside of their special expertise. This was felt necessary because of the very large number of issues and problems dealing with science and technology that came before OST. It was therefore not out of place for Knox to pepare a "think" paper for the Director, Donald Hornig on decision-making machinery. [1] Knox made the point that the support of adequate research and development, especially the latter, is the responsibility of operating sector, not government, unless it was part of the government agency mission, such as the NASA program. It was his view that the Federal government should intervene on a short time basis to correct imbalances in the civilian community, focusing on the technologically backward sectors primarily. More relevant was Knox' attachment, subject: Some Thoughts on Decision-Making Processes in the United States, especially those parts dedicated to information. Knox admitted that he strongly adhered to the view in the civilian areas of U.S. economy individual decision making in all areas was preferable, even though there might be an inevitable waste of resources, lag in innovation of functions, and duplication of functions caused by uncoordinated, unplanned operations of the ecnomy. These are outweighed, he argued, in value to the nation by enhancing the value of the individual and by stimulating creative innovation wherever it might be found. But he also acknowledged that many changes had taken place so that the U.S. society of the 1960s differed dramatically from the society of the 1920s. This in turn was undercutting traditional decision-making processes. This

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[1] Knox, William T., OST, Memorandum to Dr. Donald F. Hornig, Subject: House Committee Report on Federal Decision Making in R&D, 19 September 1966, pp 4, also Attachment pp 3.

applies specifically to the information systems problem. He wrote:

> The U.S. scientific and engineering community has relied trad-
> itionally upon the initiative and individual decisions of pri-
> vate individuals and organizations, such as professional so-
> cieties. Experience has shown that this congery was not able
> to change its operations sufficiently to avoid severe stresses
> and strains on the system, and possibly even harmful results to
> the overall good. Federal support of the development of modern,
> technology-based information systems, such as is planned, should
> be viewed as a short-term program, necessary because the exist-
> ing structure was neither financially able nor motivated to un-
> dertake the development. It is also our hope that the new inform-
> ation systems will result in a large group of users, or at least
> more extensive use by existing clientele.

> What we are trying to do is to develop a new decision-making
> apparatus among governmental and nongovernmental interests in the
> information area. This relation should be developed in such a
> way as to promote individual decision making. But at the same
> time individual decisions must be made in a manner which will
> promote the welfare of the total system...

There is no record of how Hornig responded to the Knox paper; it prob-
ably took the form of a discussion. Hornig was probably perplexed with
the notion that the national systems program for scientific and techni-
cal information was a 'short-term program', the assertion of Knox, con-
sidering what a tough nut it was to crack to get the public and the pri-
vate information-generating, information-handling, information dissem-
ination, and information-utilizing sectors to work together. This sub-
ject was not brought up for discussion to the COSATI National Systems
task group, nor was it discussed with the author of this book. Neverthe-
less, the views of Knox dealing with the primacy of the individual decisions of
persons and organizations as the best means to achieve progress, as contrasted with
strong central Federal action, would be quite compatible with the philosophy of the
reigning and previous Administration.

It was during this period that the report of the COSATI Panel (#2) on Information
Science Technology, chaired by Dr. Ruth M. Davis, was submitted.[1] It dealt with
the identification and improvement of research underway in Federal information science

[1] Davis, Ruth M. et al, Fourth Report and Revised Action Paper, Panel #2 on Inform-
    ation Sciences Technology, Submitted to the Committee on Scientific and Tech-
    nical Information, Executive Office of the President, Washington, D.C., 13
    September 1966. pp 24.

technology, the first of its type ever undertaken in the Federal government. Three actions were proposed, which although not interdependent, would be enhanced if they were implemented as a group. The objectives of the report were: to improve the quality of research underway in this area and to link its pertinence to scientific and technical information activities. Additionally, the report was one in a series to facilitate the identification of research underway by COSATI member organizations and to provide a means for interagency coordination and cooperation in support of research in information science technology.

More specifically, the report was intended to (1) Enable COSATI to support its own eeds and interests within the total Federal R&D effort in information sciences technology. (2) Isolate the technological base necessary to support a national information system and assist in effecting its achievement. (3) Provide the information base which will permit coordination of research activities between COSATI agencies. (4) Determine that subset or research aimed specifically at improvement of STI activities. (5) Identify gaps, redundancies and deficiencies in research or research management. (6) Identfy in-house expertise in the many facets of information sciences technology as well as making such expertise available to COSATI. (7) Exhibit a structure for the management of information sciences technology in support of Federal STI activities.   (8) Ensure the translation of research results into operational products where appropriate.

The Panel reported its progress to date, as follows: the derivation of a classification in which to report information sciences technology projects supported by the Federal government, the first comprehensive compilation of projects of the COSATI members using the classification structure, and the tabulation of primary project information within and outside the Federal government and of workable search strategy for retrieval of project information.

Three major actions were recommended: (1) the maintainance and updating of the existing compilation of projects for three years on an experimental basis; (2) the selection of three problem areas in information sciences technology, the resolutions

of which will materially ameliorate either recognized operation deficiencies in governmental STI activities or will result in a more cohesive, coordinated government research program; and (3) Set up on an experimental basis a distribution system to circulate a summary of publishable results of research sponsored in information sciences technology for a period of three years.

This brief description does not do justice to the total report turned in by Panel #2. The recommendations, unfortunately, were not implemented as they might have been, but they did point in the direction that would have brought progress. A machine-readable list of projects was prepared with the assistance of Mead Data on an experimental basis. Robert M. Landau, an information specialist loaned to OST by a Federal agency, should be credited for helping to get this data base into being. Unfortunately, there was no aggressive effort on the part of the Smithsonian Science Information Exchange to pick up and further the data base. If it had become a major effort on SSIE's part, the data base would have been popular in both the public and the private sectors. On the other hand, OST was not forceful enough to "stimulate" SSIE to undertake the task. The reader should bear in mind that the mid-1960s was very early in what became a strong trend in later years - the building of many data bases for science and technology. On reflection, some of the responsibility for not implementing the Davis Panel's recommendations had to be laid at the feet of COSATI and its members, but the problem at that time was that only a few of the COSATI members had any responsibility in undertaking information sciences technology research. It would probably be fair to state that there has not been anything like the work of Panel #2 in recent years, and that there is no current list of ongoing projects in the information sciences technology field available in the Federal government.

One of the COSATI products that achieved wide use was its standard for descriptive cataloging of governmental scientific and technical reports. In October 1966, a long awaited revision to the original COSATI product was issued. [1] Hubert Sauter and

[1] Sauter, Hubert E., Subpanel on Standardization of Descriptive Cataloging, Standard for Descriptive Cataloging for Scientific and Technical Reports, Revision No. 1, October 1966. Prepared for COSATI, FCST, issued by Clearinghouse for Federal STI,

Subpanel deserved considerable credit for preparing this document, which was one of

the most widely used of all of the COSATI products, even up to this day. It was not

easy to achieve agreement to these rules that brought a practical uniformity of de-

scriptive cataloging that made possible better "control" of the technical report

literature produced by Federal R&D programs. It also made it considerably easier for

information users within and outside of the goverment to retrieve technical reports

of interest. In a way, it also contributed to the development of machine-readable

data bases that are in wide use today.

In the Fall of 1966, Public Law 89-487, dealing with the right of the public for

information, came into being to be implemented on July 4, 1966. This early version

of the Freedom of information law brought some concern to scientists who feared that

their research data would be prematurely demanded and issued. The problem was brought

to the attention of the Science Advisor by the Department of Defense.[1] The writer,

George L. Mehren, pointed out that when the President signed the Act, he asked offi-

cials to begin a constructive approach towards carrying out the spirit of this law

s soon as possible. Mehren feared that the law would be used by the unscrupulous

as "a vehicle for infringement on the public interest by underminging the intellect-

ual perogatives of research scientists in the Federal establishment." He wrote:

> The first requirement of research is a man with an idea; and the imagin-
> ation, ingenuity, and diligence to see that adequate data are collected
> and processed in order to rigorously evaluate the idea. The rewards of
> prestige accrue to this creative individual as a result of publication of
> technical papers and his consequent standing in the research community.
> A requirement of premature release of a scientist's, or a group of sci-
> entists' research data prior to evaluation would gravely jeopardize
> their scientific standing. In fact, it is doubtful th at any capable
> scientist would work for an agency that did not provide a modicum of
> protection for a scientist's perrogatives. A policy of premature release
> would also invite serious interference with the work...

Mehrens gave a number of examples, dealing with research areas engaged in at the

Department of Agriculture, where premature release would jeopardize results and

[1] Mehren, George L, Assistant Secretary, Department of Agriculture, Memorandum:
   Availability of Research Data Under Public Law 89-487 to Donald F. Hornig,
   Director, Office of Science & Technology, Washington, D.C. October 3, 1966, pp 2.

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create problems. The matter was discussed at a Federal Council for Science and

Technology meeting in October, where it was determined that while theoretically

(and legally) there could be a problem, in practice, the Federal R&D managers could

control the flow of premature information within their authority, thus none was

expected. That is the way it worked out with the passage of time.

The deeper OST got into the engineering of national information systems for science

and technology, the more its information staff became convinced that the United States

should apply itself to international STI actions. Several internal memoranda were

prepared by the staff. The first of these was prepared by Curtis Fritz. He expressed

these views: [1]

> Each country should be engaged in planning and instituting national STI
> systems: to facilitate R&D; spread high costs of sophisticated informa-
> tion technology; upgrade information processes; unify varied often re-
> mote national regions; to obrain STI available from other countries in
> machine language; to prepare for future communications capabilities such
> as COMSAT; and to serve national interests by strengthened participation
> in worldwide STI systems now in the embryonic plans of organizations such
> as ICSU and UNESCO. Sample systems: National Disaster Warning System,
> Toxicological and Medical Information Systems.

> Institute national and perhaps regional information analysis centers: Water
> Resources Information Center, Pesticides Information Analysis Center, Human
> Engineering Information Analysis Center, etc., especially where research
> and evaluation of worldwide literature is exploited and brought to bear on
> unique local problems.

> Join in regional planning and study activities resulting in the establish-
> ment of joint operating information systems and/or standards and conven-
> tions facilitating inter-country transfer of STI with minimum processing
> required.

> Establish national programs of technology utilization whereby the results
> of R&D are translated into industrial advantage and economic growth. This
> can be done on an industry basis along the lines of the Department of Com-
> merce's State Technical Service Act programs.

Fritz, who was on loan from the Department of State, was a foreign service officer

and therefore interested in the international aspects of STI as well as national.

[1] Fritz, Curtis, L, OST, S&T Subjects of Interest to SEA Countries, 6 October 66,
    pp 2 (unpublished)

Knox got into the spirit and prepared a paper on information for developing countries. [1] He proposed that one or two regional centers that would feature technical documents be established, also that each nation should establish a technical information service for commerce and industry, relying on the regional centers for back-up. The United States, he believed, should assist the S.E. Asian countries with system planning, also training for managers and operators of regional and national centers, which could be based on State Technical Service programs in Department of Commerce, NASA's Technology Utilization program and USDA's Extension Service program. These centers would provide hard copy and microfiche of technical reports prepared by ID, NASA, Department of Commerce, AEC, USDA, to help small businesses in the LDCs (and in the U.S.). Knox believed that information and utilization experts should be furnished to help the developing countries.

A day or two later, he prepared a second paper which called for the establishment of a free textbook program for underdeveloped countries in Southeast Asia. [2] This program would be modeled after a similar program in Central America and Panama, carried out under the auspices of the Organization of Central American States and U.S. AID. He explained how the program was working in Latin America, and he saw no reason why a similar project, operating as a regional center, could not be operated in Southeast Asia.

Unfortunately, nothing came of these recommendations for expanded involvement. When UNESCO established the UNISIST (global scientific and technical information system) program a few years later, with the exception of a few NTIS/AID efforts, little was done on a political basis to expand U.S. assistance to developing countries.

COSATI, too, recognized that there would be an increase in the interchange of information throughout the world through electronic means as all countries began to

[1] Knox, William T, OST, S.E. Asia Technical Information Program, 11 October 1966, 1 page (unpublished)

[2] Knox, William T., OST, Free Textbook Program for Southeast Asian Countries, 14 October 1966, 1 page (unpublished)

take advantage of the marriage of computers and electronic communications. Whereupon
its Panel on International Information Activities prepared two sets of guidelines
for the public domestic and international use of federally-owned, machine-stored in-
dexes. [1] Although the two guidelines are listed together, they are actually separ-
ated, but were presented as a package because international availability is, as stated,
"predicated on domestic availability in order to avoid giving advantage, even inadver-
tently, to foreign users over domestic industry and business users." Of interest
are the advantages that would accrue to the United States by making machine-stored
indexes available to foreign nations. The Panel stated in a cover document that these
would be:(1) They may be useful as barter items to bring scientific and technical co-
operation or information to the United States. (2) Wider use of U.S. standards, equip-
ment and techniques for information processing with consequent increased international
compatability of systems. (3) Spread the use of English as the language for scientific
purposes. (4) Could increase U..S.S exports as a result of adoption of U.S. standards,
equipment and language. (5) Possible utilization of machine information systems in
U.S. programs of foreign aid or international scientific and cultural agreements. (6)
Feedback to U.S.S agencies of foreign experience in systems development and utiliz-
ation during the present period of innovation and experiment. The guidelines were
approved by COSATI and subsequently the Federal Council for Science and Technology.
There is no information about extent to which these two guidelines were incorporated
into the activities of the Federal agencies, nor is there any information whether
of not the"advantages" cited above ever materialized. However, the preparation of the
guideliness attests to the desire of COSATI and its members to think ahead.

During the same period, there was a great deal of concern expressed over patent prob-
lems. In an article published in a technical journal,[1] U.S. Patent Commissioner,

[1] Panel on International Information Activities, Committee on Scientific and Technical
     Information, Federal Council for Science And Technology, Washington, D.C.,
     Guidelines for Public Domestic Use and International Use of U.S. Federally-
     Owned Machine-Stored Indexes, October 11, 1966, pp 10.
[2] Interview with Edward J. Brenner, Nations Battle International Patent Mess, Chemical
     and Engineering News, p. 36, October 24, 1966, pp2.

Edward J. Brenner, is reported as saying:

> Today, out of more than half a million patent applications filed
> annually throughout the world,about 50% are duplicate or multiple
> filings of the same invention...The world is too small for us to be-
> lieve that patent documentation needs can be satisfied by several di-
> verse. The patentability appraisals of the quarter of a million cases
> which are now subject to repetitive filings are highly diverse in their
> results partly because of non-uniform and incomplete documentation on
> basis of which more appraisals are made.

While Brenner was talking about the problem of international patent documentation,

David Sarnoff, Chairman of the Radio Corporation of America and an acknowledged

Titan in modern communications development, took advantage of Kettering Award Dinner

of the Patent, Trademark and Copyright Research Institute of Washington, D.C., held

June 16, 1966, to make these observations about new possibilities. Some of his com-

ments follow:

> Hovering in synchronous orbit about the equator is the first stage of
> a worldwide system of high-capacity communications satellits. Soon a
> complete system of such satellites and their ground terminals will link
> all points on earth with thousands of channels for simultaneous voice,
> data, and message transmission. A new generation of electonic data
> processing systems is emerging capable of storing up to 100 million bits
> of information and retrieving them in fractional millionths of a second.
> These systems are beginning to provide central computing and reference
> services for subscribers scattered over large areas. Other new elec-
> tronic devices are being joined to computers to transmit, store, and re-
> trieve information by sight or sound, and by the display of words, dia-
> grams, or pictures. It will become commonplace, for example, to speak
> directly over any distance to a computer and to receive the answer with-
> in seconds in either sound or sight on a display screen or in electron-
> ically printed forms. These various systems can be combined to peform
> all of the technical functions for a world patent center that could re-
> ceive and process applications from inventors everywhere. This center
> could be the focus of the world patent system, linked to all countries
> by high-capacity satellite communications and built around a large data
> processinf and information storage system...

While some gains have been achieved in what Brenner called "the international patent

mess", we are not even close to the dream that David Sarnoff shared at the Ketter-

ing Award Dinner almost two decades earlier, but we are moving in the right direc-

tion. While the mandarins of science, technology and communications were declaiming

on theirvisions of the approaching Information Age, the OST staff exerted their

energies in a variety of stages, some central and some side, to keep the Bureau of

the Budget aware of the mundane problems in making progress in the Federal information

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scene. BOB was deeply interested in OST and COSATI information activities. For example, a BOB review on the subject was held with the OST STI staff in which the following topics were discussed. [1]

Development and implementation of <u>Networks for Knowledge</u> concept.

Resolution of problems relating to the National Advisory Commission on Libraries.

The Department of Interior proposed National Library for Resources.

International information activities - Organization for Economic Co-operation and Development and ICSU/UNESCO.

National Systems for STI and the "responsible agency" concept for system components.

Different routes to obtain action on identified problems via COSATI or OST.

Project-reporting - increasing its effectiveness and broadening its utilixation.

Problems of internal coordination by agencies of their STI programs and stewardship reviews of agency information programs.

Data programs (as differentiated from documentation programs) entering center stage of OST interest.

User charges for information disseminated by the Federal agencies.

Mechanization of information systems and legal aspects relating to the gathering and distribution of information in mechanized information systems.

There is no record of any agreements that were reached during the review, but it was becoming evident that the BOB representatives were "almost in shock" as they began to obtain a better understanding of the dynamics of the COSATI-OST develop-ment program and the portent of the Information Age. Bureaucrats do not normally appreciate change, since it upsets their carefully organized and structured worlds. The information revolution was and is an unwelcome transgression for those who made their way to the top with an older, more traditional information-handling culture. Lacking a blueprint or experience in the new ways, every evidence of change can be frustrating, something to be challenged, sometimes to be grudgingly accepted. It was obvious that some of the BOB personnel did not understand what was going on in OST and COSATI and disliked the investments, mostly in manpower, that COSATI required.

[1] Aines, Andrew A., Office of Science & Technology, Washington, D.C., <u>Issues for Bureau of Budget Review</u>, October 23, 1966.pp2.

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On November 1, 1966, William T. Knox, chairman of COSATI left the government to return to private industry as vice-president of McGraw-Hill Company, which at that time was setting a new course into the burgeoning world of electronic publishing. Colonel Andrew A. Aines, U.S. Army, who had been the executive secretary since June 1964, following 19 months duty as the first director of Army Technical Information and Chief, Scientific and Technical Information Division, U.S. Army Research Office, was made the acting chairman of COSATI. The pioneering work done by Knox, his leadership, and his high standards of performance brought him many kudos from the Science Advisor, many scientists and engineers, and from his peers in the Federal agencies. A couple of years later, Knox left McGraw-Hill and returned to government employ, this time as the Director, National Technical Information Service. It was at this post that Knox was a victim of cancer and subsequently passed away, leaving behind a legacy of accomplishment in the science communication area that was unique and unsurpassed. Knox was generous, articulate, and imaginative in his leadership role. His much too early death deprived the scientific and technical information community, indeed the world of science and technology, of an unusual, goal-oriented man, who is missed to this day.

Another individual who was considered to be a trail-blazer in the information field was Wilson Fazar, Bureau of the Budget, who worked very closely with Knox and Aines. Infected with the virus of progress in this field, Fazar very perceptively wrote: [1]

> At the moment, drives by at least three communities are gaining momentum to establish an Executive Office group, a Presidential Council or Commission with responsibility to perform central guidance and coordination functions over the information handling

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[1] Fazar, Wilson, Notes on Concurrent Drives to Establish Presidential-Level Organizations to Coordinate Information Activities for Different, but Overlapping, Communities, November 10, 1966, Draft, pp 2.

and exchange activities to serve respective community inter-
ests. One, for the R&D community and the scientific and tech-
nological information to support R&D programs and projects,
FCST has approved the establishment of a central group in OST
to coordinate and gradually evolve the development of national
scientific and technological information systems. Two, in the
field of socio-economic-statistical information, the Kaysen
Report recommends the establishment of a Director, Federal
Statistical System, in the Executive Office, with direct re-
sponsibility for the operations of OSS, Census, and a new Na-
tional Data Center. Three, Senator Muskie's Subcommittee on
Intergovernmental Relations is driving for the establishment
of a National Intergovernmental Council (S.3509) "to advise
the President with respect to the formulation, implementation,
and coordination of domestic policies and programs which affect
intergovernmental relations and the Nation's economic and social
development...." In this same field of interest, Senator Ted
Kennedy has proposed (S.J.Res.187) establishment of an Advisory
Council on Intergovernmental Relations to study information in-
terchange between Federal and local governments and make recom-
mendations on the desirability of developing a modern informa-
tion system to collect, store, evaluate, sort, and disseminate
information relevant to officials of States and localities.

Fazar stated that there were signifcant overlaps in all of these sys-

tems and that there was a need for systems development to gain greater

benefits from trade-offs among them. He added a fourth area:

On September 2, 1966, the President created the National Advis-
ory Commission on Libraries to "make a comprehensive study....
of libraries....as components of the evolving national informa-
tion systems."

Fazar concluded his paper with these questions:

All four of the communities of interest names above are so re-
lated, overlapping, and interacting that they pose these ques-
tions for decision: Should we establish three, four, or more
central guidance superstructures to perform comparable and
interrelated functions at the Presidential level? Should we
establish a single National System Program Office to evolve
gradually the coherent and compatible National Information Sys-
tems required for all categories of information, information
programs, and sectors of this nation? Should we assign initial
comprehensive central coordination responsibility to a group in
OST, where earliest leadership and experience has been demon-
strated for the development of coherent information systems?

Alas, the Bureau of the Budget found in trying to implement the recom-

mendations of the Kaysen Report, calling for a national data center,

considerable resistance and public outcry about a possible loss of pri-

vacy for individuals. It took the prudent-at-the-moment action and

abandoned the program. The singe-ing effect was sufficient to turn

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vice fell on deaf ears. OST's plea for resources to move forward on

the national scientific and technical information system made no head-

way in BOB, a victim, at least in part, of OMB's unfortunate experience.

Although considerable progress was being made on individual agency

scientific and technical information programs, there were critics in

Congress who had strong doubts about the efficiency of Federal R&D man-

agement.

Congressman Henry Reuss (D.Wisc.), chairman of the House Government Op-

erations subcommittee on research and technical problems, was quoted

as follows: [1]

> The Federal government spends almost $4 billion annually on R&D
> in its own laboratories and another $12 billion elsewhere on
> such programs. But there is no annual report on projects
> undertaken by these laboratories, how these projects tie in
> with Federal program objectives, what facilities and staff we
> have, or even where the laboratories are located...Equipment
> is purchased, capitalized and often forgotten...While several
> parts of the Executive Office of the President have an interest
> in Federal laboratory resources, there does not appear to be
> any single office with over-all responsibility for laboratory
> utilization.

Reuss believed that it was not always true that there was sufficient

coordination. In the environmental pollution area there appeared to be

a need to coordinate the coordinators. The basic problem, according to

Reuss, was in the mechanics of management. Had the study referred to

by Reuss been undertaken by more experienced individuals, they would

have found a vast indifference to efficient and effective R&D informa-

tion management systems, differentiating these from scientific and

technical information system management. Perhaps one reason for the

lack of high priority on R&D management achievement resulted from the

training of the scientists and engineers, as well as their set of values.

[1] Walsh, Robert K., Research the Federal Research, Probers Ask, article
in Washington Star, November 14, 1966.

Most of the Federal R&D managers who entered the Federal service were more involved with benchwork than they were with administration before they arrived. Administrative paperwork was unpopular, especially in the academic environment, and this was carried over when they donned their government white coats. Much of the needed effort was turned over to subordinates. Those from industrial laboratories fared only marginally better in establishing powerful R&D management information systems. The problem still persists today. An organization such as the National Science Foundation, which has spent billions of dollars since its formation in the 1950s, and whose products are purely inform-ation, either reports in scientific and engineering journals or, on occasion, technical information reports, does not have a scientific and technical information system which makes it possible to obtain the recorded results of all of its work. Nor does it have, at the time this is being written, an NSF-wide unit dedicated to STI management and dissemination. Actions are now being contemplated to rectify this unexplainable condition. Returning to the Reuss concern, the subject received some internal OST attention and it was decided that OST and COSATI were so deeply involved in scientific and technical information matters that needed attention, it would be an over-extension to get into non-scientific information matters at that time, even though the problem needed attention.

Some observers are inclined to believe that little consideration was given to user charges policy until OMB began to press this subject in the last few years. This is not in accordance with the facts, as re-vealed in a memorandum on the subject written in 1966.

[1] Aines, Andrew A. and Hornig, Donald F., Internal Memorandum and Response, November 17, 1966, pp2.

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The COSATI Panel on Operational Techniques and Systems was asked to ponder on the issue largely because there was a lack of consistent policy on the subject. Federal agencies differed sharply on what and who to charge for Federal scientific and technical information reports. After considering the problem, the Panel sent a report to the Chairman of COSATI.[1] The inquiry was restricted to depository libraries, which were recipients of Federal agency technical reports as specified in the Depository Library Act (PL 87-579), the Atomic Energy legislation (USC Title 42, Section 2161), and the National Aeronautics and Space Administration legislation (USC Title 42, Section 2473). Pointing in the direction of charging for STI reports were the President's Memorandum of May 17, 1966 on user charges, the Clearinghouse (now NTIS) Charter (PL 776-81st Congress), and the State Technical Services Act of 1965 (PL 89-182). Stiles acknowledged that both the Executive and Legislative intent was obviously that all services provided by the government be made "self-liquidating or self-supporting through user charges with a few exception." The exemptions were listed as follows:

> Where the service is provided to all the people more or less equally, such as the protection provided by the Armed Forces.
>
> Where the persons to whom the services are supplied are unable to pay the costs, such as the maintenance of veterans' hospitals or research in rare diseases.
>
> Where the services are necessary to achieve national objectives, thus AEC and NASA are enjoined in their enabling legislation to disseminate their technical information rapidly to facilitate technology transfer, also aid to education, and promoting the vigor of industry in all of the states (State Technical Services Act.

With rare candor, Stiles stated that "the Panel on Operational Techniques and Systems is unable to formulate an answer to the question." His Panel was floored by the problem that "A single technical report

[1] Stiles, E. Edmund, Chairman, Panel on Operational Techniques and Systems, User Charges Policy Question, Memorandum to Chairman, Committee on Scientific and Technical Information, Federal Council for Science and Technology, 14 November 1966, pp 2.

may in one instance be essential to the education of an engineer
in another provide profitable data to a corporation, and in a third,
promote the development of a technology. A single depository may
support both education and industry and there were few instances where
a clean line could be drawn."

What Stiles and his Panel found was there were irreconcilable problems
stemming from the PSAC (Weinberg)Panel's assertion that the cost of
Federal R&D already includes the cost of dissemination, the general
Federal policy to keep the costs of the STI reports as low as possible
to promote wide dissemination, and the difficulty of establishing a
uniform selling price that would make the dissemination program self-
supporting. The problem became even more difficult over the years
with the emergence of the commercial information vendors and the ar-
rival of computerized data bases and electronic networks supplying
machine-readable information materials.

How do presidents learn about information issues, challenges and opportunities?
One route that was open to the information experts on the staff of the Office of
Science and Technology was the opportunity given to them, along with all of the other
technical assistants, to recommend statements to be included in State of the Union
message that the President makes to Congress. There was no guarantee that their sug-
gestions would appear in the final presidential document, of course. There was a strong
probability that they would be screened out by the Director, Office of Science and
Technology. But the information staff felt that they had the responsibility for
enunciating the outlook of the information community in a manner that would be edu-
cative, at the least, and if accepted, would give official sanction to initiatives
that were forward-looking. Two documents were submitted to the Science Advisor making
recommendations for the upcoming State of the Union Message.[1]

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[1] Aines, Andrew A., dated 23 November 1966, and Fritz, Curtis L, dated 28 November
    1966, State of the Union Suggestions. Submissions to the Director, Office of Science
    and Technology, Executive Office of the President, pp 4.

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An excerpt from the Aines paper:

> It is mandatory that each Federal agency continue to take steps to
> install fully modern information systems...Not only do I expect all agencies
> to utilize modern information technology to the fullest, I expect them to
> maintain a competent staff, responsible to the head of the agency, to dev-
> elop and supervise internal communication systems that are compatible with
> other agencies. Moreover, I expect these systems to be fully used and imp
> proved with the passage of time. I want each agency head to be familiar
> with the information needs, not only of his own agency, but of groups in
> and out of the government, especially Congress, and to fashion these systems
> to meet these needs efficiently and economically.

An excerpt from the Fritz paper:

> With the advent of advanced communications techniques and the comcomitant
> centralization of population and increased complexities of living, the role
> of the university in continuing education and a cultural catalyst in local
> society should be re-examined and recast as appropriate to meet newly de-
> veloped or modified needs...National information systems should be institut-
> ed for transferring the fruits of science and technology to other national
> programs of security and general welfare. Federal information systems in
> science and technology should be inter-related with those in state, private
> and academic sectors to the mutual benefit of all.

It would be pleasant to report that these comments were used in the State of the
Union message; they were not in the form provided, unfortunately. The intense com-
petition results in winners and losers. We lost the skirmish, but were not dissuad-
ed that we would lose in the long run. This incident is reported because it is
in dramatic contrast with the present. We have entered the Information Age to a
much greater extent than we did in the mid-1960s, but we have less opportunity to
bring our views about the need for top level involvement in the information "revo-
lution" to our national leaders. The Office of Science and Technology Policy, unlike
its predecessor, the Office of Science and Technology, does not have information
staff experts, knowledgeable enough to present suggestions for S tate of the Union
messages. The need for such recognition continues to grow, however.

Another example of how information expertise in the Office of Science and Technology
could contribute to other issues that came before that office is seen in an invita-
tion made by the Director, OST, to his staff asking for views on how to raise the
European technology level, a matter of concern during the mid-1960s. Aines presented

his views in a document that is summarized as follows: [1] If a serious effort is

to be undertaken, there is need for a paper with recommended goals and objectives,

including a statement of limiting factors -- just how far the United States is will-

ing to go in such a project. Simultaneously, there is need for a fact-finding

effort that should result in a database of what is right and what is wrong with

European technology as seen by the Europeans and observers in the United States.

In keeping with his responsibilities in information matters, Aines suggested that

we:

> Agree to assist in the development of a modern international STI system,
> based on the use of modern information technology.

> Agree to increase the quota of Europeans studying in our universities
> dedicated to science, technology and economics.

> Announce the establishment of a government-sponsored Institute for In-
> ternational Cooperation with a strong focus on technology transfer and
> utilization.

> Announce a full-scale review of licensing practices, tariffs, copyrights,
> patents with the view to loosening controls and increasing the availa-
> bility of valuable scientific and technical knowledge.

> Disclose a willingness to undertake new joint R&D ventures with Europ-
> ean countries and an increase in the overseas rewearch grants programs.

There were a number of other recommendations made in the document. Here again, the

policy of Dr. Donald Hornig, the Director, OST, that all of his technical assist-

ants, each with a different background and outlook, can and should contribute their

views was in evidence. In this particular case, the various inputs from his staff

were the ingredients of a contingency plan that could be put together if there were

over-riding political reasons for actions by the Federal government. For each of

his technical assistants there was a process of enrichment as the issues were field-

ed and considered in a team fashion. But there was also a dividend to the efforts of

the Federal Council for Science and Technology, in this case COSATI, a broadening

effect that undercut parochialism and narrow vision and more of a tendency to keep

the "big picture" of Federal and national science and technology in full view.

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[1] Aines, Andrew A, Memorandum for Dr. Donald F. Hornig, Director, Office of Science
     and Technology, Subject: Campaign to Raise the Level of European Technology,
     5 December 1966, pp 6.

2.3.3

A review of the activities of the Panel on Operational Techniques and Systems was undertaken when it became evident that the mix of individuals on that panel were unable to get a grasp on the problem of charges for information services. In light of what this panel was accomplishing, it was unfair to be critical. Among its actions being undertaken during 1966 were: [1]

> Preparation of the Joint Corporate Author List, including procedures for continuous updating.
>
> Continued testing and improving the COSATI Standard for Descriptive Cataloging.
>
> Establishment of Standard Data Elements for exchange of bibliographic information, indexes and abstracts of technical reports.
>
> Establishment of a standard for providing bibliographic citations of technical reports on magnetic tape.
>
> Establishment of Conventions for Thesauri Compilations.

It was recognized that the group as constituted was not management-oriented. and that the management of large scale scientific and technical information programs was now becoming increasingly important. Consequently, a new Panel on Management of Information Activities was formed under its chairman, Walter Carlson, Director of Defense Technical Information. A charter was prepared for this new group with the following scope: [2]

> While the Panel will concentrate on those aspects of programs that are common to the government agencies, it will also be oriented towards providing COSATI members involved in the management of information programs with data, advice, and recommendations designed to assist them in achieving improvements internally. The Panel will also assist managers in seeking ways to carry out cooperative programs with other agencies and groups in and out of the government....

More specifically, the Panel was asked to prepare procedures for an effective planning, programming, and budgeting approach to information services; ...to make recommendations leading to guidelines and policies concerning user charges for government-provided information services; ...to provide management with techniques to measure the effectivenesss of the information programs and the benefits to the R&D programs and projects they serve.

[1] Stiles, H. Edmund, Chairman Panel on Operational Techniques and Systems, Memorandum (untitled) to Andrew A. Aines, Chairman, COSATI, 2 December 1966, pp 2.

[2] Committee on Scientific and Technical Information, charter for the Panel on Management of Information Activities, 10 December 1966, pp 2.

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During this period of self-examination, Dr. Hornig asked for a list of examples of leadership in the scientific and technical information area attributable to the efforts of the OST and COSATI staff. A partial list was provided from which excerpts are drawn: [1]

> Helped in the establishment of the NAS-NAE Committee on Scientific and Technical Communication.

> Helped establish the National Advisory Commission on Libraries that ultimately became the U.S. National Commission on Libraries and Information Science, a permanent independent agency.

> Established at the National Library of Medicine a computer-based toxicological information system.

> Prepared major report on medical libraries (Herner Report), thus contributing to the programs of the National Library of Medicine and regional medical libraries.

> Helped obtain funds for the building of the Lister Hill National Center for Biomedical Communications.

> Encouraged the appointment of high level STI focal points within the Federal R&D and other agencies.

> Prepared plans for a national system for scientific and technical information programs.

> Formulated a Federal page charge policy.

> Contributed to international policy and programs through the work of the OST staff with the Organization for Economic Cooperation and Development, the COSATI Panel on International Activities, UNESCO, and many other groups, governmental and professional.

> Establishment of the National Referral Center at the Library of Congress, the Smithsonian Science Information Exchange, and the Clearinghouse for Federal Scientific and Technical Information (now NTIS).

> Interacted with leading professional societies involved in science communication, including the American Cemical Society, American Institute of Physics and others. This inclu ded the establishment of the Interagency Chemical Information Policy Group.

> Provided close coordination and leadership to the Federal agencies involved in STI programs through COSATI as well as OST efforts.

> Conducted national conferences, a notable example being the National Engineering Information Conference, held at the Department of State.

> Supported strong efforts of the Federal agencies in the creation of information analysis centers.

> Worked with the Civil Service Commission to establish a more uniform and higher level standard for STI professionals.

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[1] Siveck, Lee, Office of Science and Technology, Examples of Leadership Displayed by Dr. Hornig's STINFO Staff, 19 December 1966, pp 2.

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> Invited by congressional committees, a number of presentations were made on behalf of bills, to provide advice, and to interact on future legislation involving scientific and technical information matters.

> Assisted the Bureau of the Budget on agency scientific and technical information programs and budgets.

> Made on-site program and budget reviews of the Federal agencies.

> Assisted the American Business Press, Incorporated in organizing a group called the Government and businessScientific and Technical Information Committee (GOBSTIC) to keep the private information sector informed of government programs, policy and plans.

> Undertook a series of major studies in formal and informal communications, data systems, abstracting and indexing, medical and toxicological systems, space data systems, and others.

> Acted as an ombudsman for the private sector publishing community in cases where they believed there was unfair competition by Federal agencies.

Hornig evidently felt that the record of achievement of his OST staff and the COSATI community far outweighed the cost of the operation and continued to provide valuable support to the program.

An example of the close interaction between COSATI, the National Academy of Science-National Academy of Engineering (SATCOM), and the private sector is revealed in a report of a meeting held in the McGraw-Hill corporate office late in 1966. [1] McGraw-Hill spokesmen made several presenations, including one from the McGraw-Hill president, Shelton Fisher, which indicated that the corpporation was preparing to exploit "Post-Gutenberg" communication media to the fullest and to employ the same data it produced in different media. Through its aggressive analysis and promotional program under Jerry Luntz, it worked hard to seek new exploitable opportunities. Through its large internal staff and external correspondents located in 21 states and 12 foreign countries, it was working hard to stay close to users to know what information they were willing to buy. What they were concerned about was that the Federal government might preempt a large section of the information market.

Interestingly, William T. Knox,/a McGraw Hill Vice President, made a few comments
now

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[1] Aines, Andrew A., Highlights of SAATCOM Meeting Held in New York City, 16-17 December 1966, Memorandum to Donald F. Hornig, Director, Office of Science and Technology, pp 4.

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that are worth recording. He stated that the National Science Foundation and the

Office of Education should provide funds for the exploitation of knowledge produced

by private enterprise. While he saw justification for the government becoming involv-

ed in a chemical information program, he was concerned that it would get involved in

educational and other programs. It was his view that the private sector is better

equipped than the government to undertake programs requiring flexibility, as the gov-

ernment lacks a sensitive mechanism for correcting errors. He was worried by the

Office of Education's Educational Research Information Center (ERIC) getting into

social sciences, like psychology and physiology. He also expressed the view that the

government underestimates the costs of its information services, only listing printing

costs. All in all, it was a fascinating presentation from a person who had been,

only a few months before, the architect of the Federal information program, not that

his criticisms were far from the truth.

Harrison Brown, the Foreign Secretary of the National Academy of Sciences discussed

the role of the International Congress of Scientific Unions, which was gearing up

with UNESCO to es t ablish a global scientific and technical information program.

He was followed by Calmer Sherwin, who had been doing work with the Office of Sci-

ence and Technology on standards for scientific and technical communication. Eugene

Garfield, president of the Institute for Scientific Information, advised both the

government and the professional societies, who were working together cooperatively,

that they should avail themselves of the services of private enterprise. and the gov-

ernment should cease providing subsidies for non-profit organizations and confine it-

self to seeing that the public interest was being served. He expressed discomfort

(He ameliorated his views in the 1980s.)

about government"give-away" programs like MEDLARS. He wanted the government to pro-

vide grantees doing federally-supported research with funds so that they could buy

own

information services, like his/ISI services. The education of scientists in the use

of information resources was being neglected. Finally, it was his belief that

the distinctions between information scientists and other scientists will vanish, when

they all recognize that they are in the information business.

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The rest of the meeting was devoted to SATCOM matters and how it sought to solve the problems and issues facing the United States in the scientific and technical information area. Unfortunately, there were no follow-up meetings of this sort in subsequent years.

In the middle of December, the long-awaited Systems Development Corporation study for the National Systems Task Group - A System Study of Abstracting and Indexing in the United States - was completed and submitted to COSATI's Task Group on National System(s) for Scientific and Technical Information. The major COSATI study was issued November 1965, Recommendations for National Document Handling Systems in Science and Technology. The Abstracting and Indexing study was one of three follow-on studies called for by COSATI. The other two were on informal communications and data-handling. As early as 1963, the Committee on Science Information (COSI) had already determined that abstracting and indexing of the significant literature were central to effective scientific research services both within and outside the government. Because of the rapid proliferation of scientific and technical literature, it was clearly recognized that abstracting and indexing techniques and services had to be vastly improved in the future. The purpose of the study was threefold:

1. To determine the role of abstracting and indexing (A&I) in the national system of scientific and technical communication.

2. To determine the current status and problems of the A&I services.

3. To determine what actions the Federal government might take to bring about desired improvements.

The study team found it necessary to devise a concept relating various parts of the national scientific and technical information system together into a homogeneous whole. While in a sense it is an oversimplification, it provided, nevertheless, a consistent way for the members of the team to appraise the problems and

[1] Barrett, Raymond P, et al, A System Study of Abstracting and Indexing in the U.S., System Development Corporation, Falls Church, Virginia, Undertaken for COSATI by means of NSF Contract (NSF-C-464), Technical Memorandum TM-WD-394. PB 174 249, 16 December 1966, pp 228.

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the issues and the parameters for further study. The concept was represented
as follows by the study team:


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┌─────────────────────────────────────────────────────────────┐
│      NATIONAL SCIENTIFIC AND TECHNICAL INFORMATION SYSTEM     │
└─────────────────────────────────────────────────────────────┘

┌──────────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ INFORMAL COMMUNICATION│   │ DOCUMENT HANDLING │   │  DATA HANDLING   │
└──────────────────────┘   └──────────────────┘   └──────────────────┘

┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
│ ACQUISITION  │  │  DOCUMENT    │  │ DISSEMINATION│  │  STORAGE &   │
│  SUBSYSTEM   │  │REPRESENTATION│  │  SUBSYSTEM   │  │  RETRIEVAL   │
│              │  │  SUBSYSTEM   │  │              │  │  SUBSYSTEM   │
└──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘
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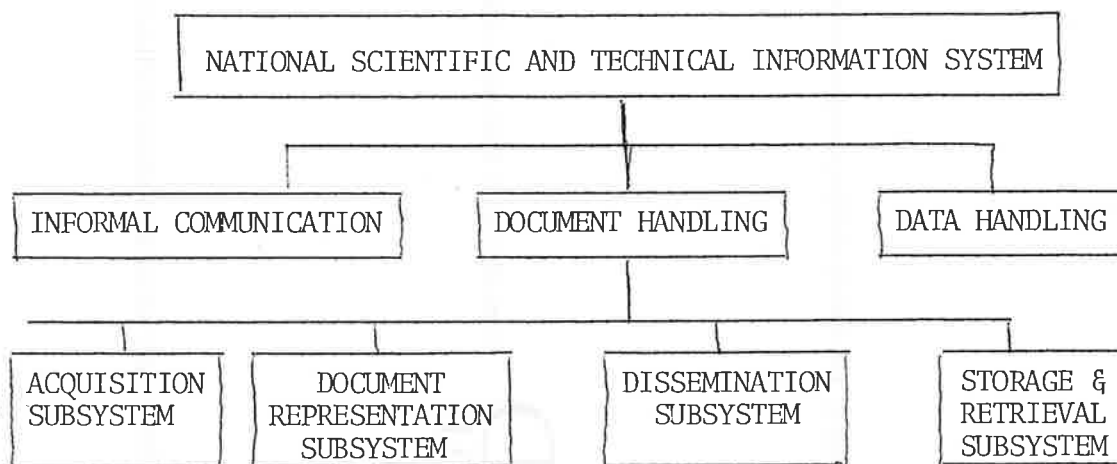
Figure   . Source: SDC A&I Report (p.3)

The report is organized into seven chapters: Introduction, A&I Production in the
United States, Statement of the Problem, Assumption and Requirements for a National
Document and Representation Subsystem, Document Representation Alternatives, Organ-
izational Alternatives,/Conclusions and Recommendations. Six Appendices and a
Bibiliography are added.
                       and

A summary of the conclusions follow:

> 1. The present ad hoc "system" for abstracting and indexing in science and
> technology is beset with problems shared by users, A&I services and government.
> Interaction between the three groups is complex. Current needs and future re-
> quirements are unclear.

> 2. No mechanism exists to   relate public and private groups together, nor
> are resources to handle current needs and plan for the future available.

> 3. The Government has a responsibility to take the initiative.

> 4. Any national document representation system must be viewed as a subsystem
> within the framework of a national document handling system.

> 5. Reliable data are lacking on characteristics, costs and utility of part-
> types of document representation or the best ways to develop such data.

> 6. The private A&I sector must be involved in any future national document re-
> presentation system.

Some of the recommendations called on COSATI to take immediate action as follows:

> 1. Review and endorse the SDC Report and send it to the A&I community as a
> first stage analysis calling for careful and detailed response.

> 2. Adopt the Report's requirements statements as guideline principles for the
> national document representation subsystem.

3. Sponsor and support a conference of public and private A&I services to sharply increase communication and cooperation among these organizations and to work out consensus plans for the future.

4. Sponsor and support future detailed studies to develop methodology and criteria to measure cost effectiveness of alternative representations and to develop needed standards.

In retrospect, while COSATI did not "pick up the ball and run with it" along the lines recommended by the SDC Study Team, there was accelerated action by the National Federation of Abstracting and Indexing Services (NFAIS), a not-for-profit assemblage of private and some governmental A&I service managers. There are probably still some ongoing problems in the A&I area, even new ones that are characteristic of electronic network services, but there is considerably less anxiety than in the 1960s. The problems of "data tagging" or the lack thereof/ are receiving attention if not action currently. There is also some small movement towards "full text" services, but the cost of these will be more than most users are able to afford, at least for the present.

A minor but memorable diversion took place during 1966. This was formation by SATCOM of an Ad Hoc Panel on Scientific Information in the Natural Resources Area, chaired by John C. Calhoun, Jr, Vice President for Programs of Texas A&M University. Its genesis was the result of a request by Howard Eckles, Department of Interior, early in 1966, at an Airlie House workshop of the Task Group on National Systems, to representatives of SATCOM. Here are excerpts from an OST internal memorandum that explains the discomforture. [1]

> Bill Knox and I were acutely uncomfortable with the alacrity with which SATCOM agreed to the request and concerned about the potential problems that could result from an inexperienced group delving into complex agency and interagency problems. There was also a well-defined suspicion that the Department of Interior wanted to get the weight of NAS-NAE behind the push to organize a natural resources information system. Most important, we were uncomfortable because of the strong possibility that SATCOM would fail to focus on its mission to provide a bridge to the scientific community and get into the "government-watching" business.

The ad hoc Panel met twice with the Department of Interior staff and then engaged in a private meeting, not attended by OST representatives. The memorandum to Hornig

[1] Aines, Andrew A., Memorandum to Donald F. Hornig, Director, OST, Subject: SATCOM Report on Department of Interior Information Problem, 21 December 1966, pp 2.

than reported:

> It was apparent to the ad hoc group (and this observer) that the Inter-
> ior people wanted to have the study group make recommendations to
> strengthen the hand of the Secretary of Interior in controlling his
> Bureaus. It was also apparent that a lot of agency "soiled linen" was
> displayed and that there was but little demonstration of hard-headed
> agency thinking about its information problems.

As the inquiry unfolded, it was evident that the Secretary of Interior was finding

it difficult to establish complete control over the STI programs of the various

bureaus of the agency and through his science advisor sought to apply pressure

through the use of SATCOM which hopefully would make the requisite recommendations.

The device used was not unknown in the annals of the Federal government, but what

was most disturbing, returning to the memorandum, was:

> the realization that OST and COSATI had no mechanism and no resources
> at their disposal to readily do what the SATCOM group was able to do,
> even though theirs was a "catch-as-can" performance.

The dilemma of diluted power on the part of COSATI was earlier recognized by the

House Select (Elliott) Panel in 1964. It could only achieve its goals through the

agreements of the Federal agencies, otherwise, it could only be advisory without

the power of sanctions, unless sought through BOB's fiscal authority or president-

ial directives, a difficult task unless priorities were very high.

While there was doubt in the minds of the COSATI staff that the use of SATCOM was

wise, because of its hope that it would act as the bridge between the government

STI managers and the leaders in science and technology on a national basis, there

was no question that the Department of Interior would be better off with a stronger

central STI program. The notion of tieing it to a new information program in the

natural resources area was also thought to be good strategy. SATCOM's final report

turned out to be a good one, even though it was not based on a more rigorous study. [1]

The members of the Panel were: Dr. John C. Calhoun, Jr., Vice President for Programs

of Texas A&M University (Chairman); Dr. Maynard Hufschmidt, Professor of City and

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[1] Calhoun, John C., Jr.et al, Report of the Ad Hoc Panel on Scientific Information
in the Natural Resources Area, Prepared as a Contribution of the NAS-NAE
Committee on Scientific and Technical Communication, December 8, 1966,pp7.

Regional Planning, University of North Carolina; Dr. George Sprugel, Jr., Chief,

Illinois Natural History Survey; Dr. William C. Steare, Director of the New York

Botanical Garden, and Dr. Merle A. Tuve, Carnegie Institution of Washington.

After describing the progress in information programs in individual bureaus and pro-

ram divisions, the team stated:

> Yet taken together, these endeavors vary considerably in their scope
> and originality. Many of them may serve only special internal needs
> or limited national professional groups, failing to cover even as much
> as the complete needs of a Bureau within a Department; but they are
> of adequate responsiveness to the requirements of their users.

The team report indicated that with the possibility of the agency becoming the

Federal agency responsible for all natural resources, the needs for a commensurate

STI program was evident.   Some of its recommendations were as follows:

> 1. An Executive Assistant for Scientific Information Programs, who
> would work closely with the Department 's Science Advisor, be appointed.
> His responsibility would embrace planning supervision, operational lead-
> ership and long term guidance. A fund of $200 to $300 thousand would be
> provided him for experimentation.
>
> 2. A Scientific Information Council, reporting directly to the Secretary,
> would be formed to work with the Science Advisor and the Executive Assis-
> tant for Scientific Information. One alternative was that the Scienti-
> fic Information Council would be an activity of the National Research
> Council. SATCOM, too, would be available to the Department of Interior
> to work with it on "pivotal issues of policy."

To complete the record of SATCOM and its involvement with Federal agencies, the

record also reveals that it met with representatives of the Atomic Agency Commission

and provided advice to that agency.   SATCOM also became involved with the Depart-

ment of Health, Education and Welfare in the toxicological information handling

area and took it on itself to appoint a task group on toxicological information to

be advisory to the Surgeon-General, Office of the Secretary, DHEW. Whether or not

the gesture was reciprocated is not known. No information from the Surgeon-General

to the Office of Science and Technology on this subject was received. SATCOM's will-

ingness to work with the Federal agencies has to be regarded in a positive light,

except for OST's anxiety that the most appropriate role for SATCOM was to provide

a much needed channel to American scientists and engineers to keep them actively in-

volved in the upgrading of science communications as the world entered the Informa-

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Age. OST recognized that the shift from "ink-print" publishing into electronic publishing and transfer of information, without abandoning the conventional means of communication, was going to call for close teamwork between the public and the private infortion sectors.